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UNITED STATES BUREAU OF EDUCATION
BULLETIN, 1915, NO. 21 - - - - - - WHOLE NUMBER 648

SCHOOLHOUSE SANITATION

A STUDY OF THE LAWS AND REGULATIONS GOVERNING THE HYGIENE AND SANITATION OF SCHOOLHOUSES

By WILLIAM A. COOK
HIGH-SCHOOL VISITOR, UNIVERSITY OF COLORADO

WASHINGTON
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1915

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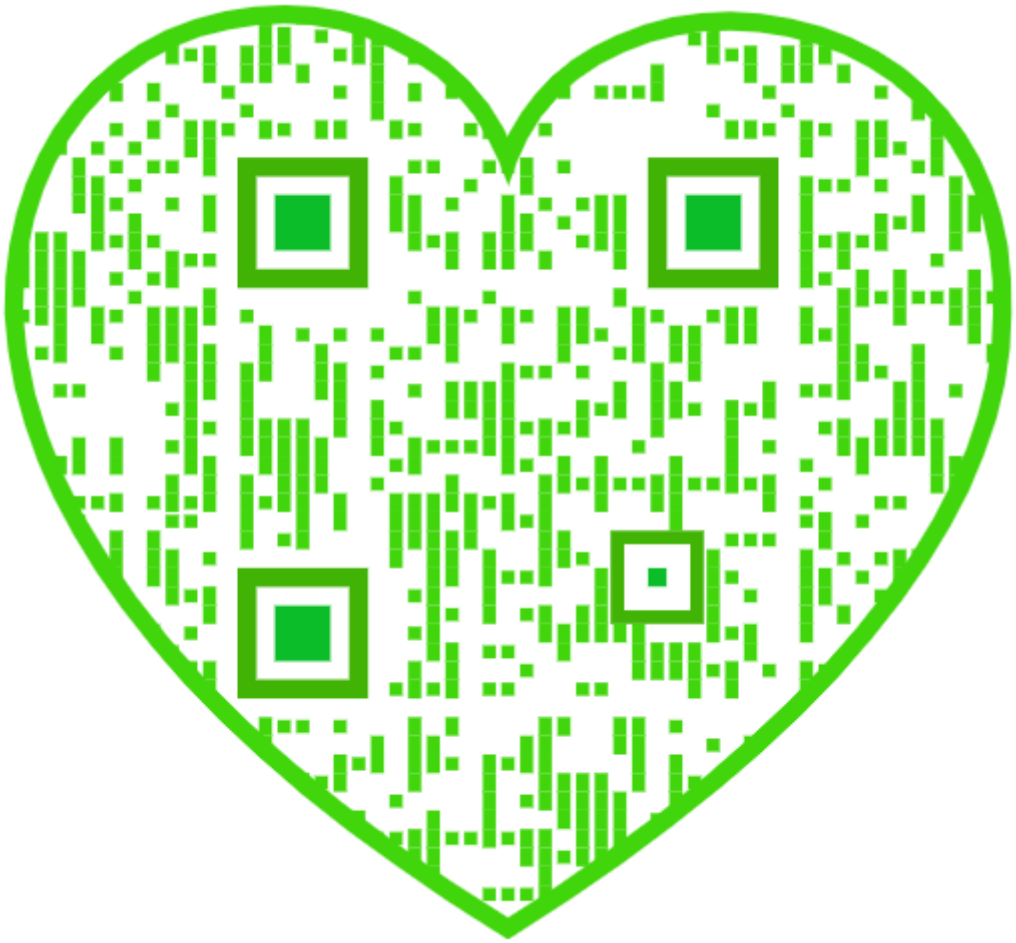

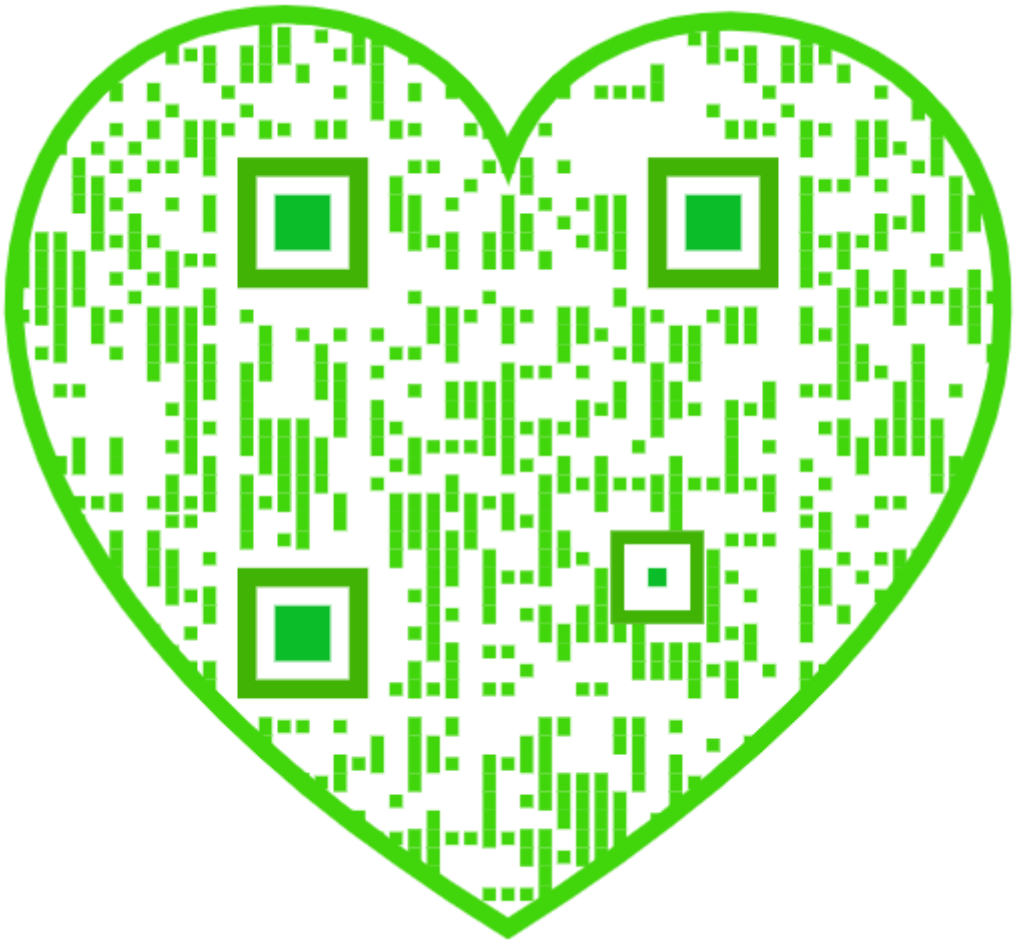

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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, June 1, 1915.

SIR: With the increase of population, the lengthening of the school life of children, and the consolidation of small into large schools, often with many hundreds of children in one building, the care of the health of children while in school becomes correspondingly more important. Since the health of school children depends to a large extent on the location, heating, lighting, ventilation, and other sanitary arrangements of schoolhouses, the laws of States and the regulations of boards of education relating thereto are of great interest and importance to all. I therefore recommend that the accompanying manuscript on schoolhouse sanitation, the result of a study by Mr. William A. Cook, of the University of Colorado, into laws and regulations governing the hygiene and sanitation of schoolhouses, be published as a bulletin of the Bureau of Education.

Respectfully submitted.

P. P. CLAXTON,
Commissioner.

The SECRETARY OF THE INTERIOR.

SCHOOLHOUSE SANITATION.

A STUDY OF THE LAWS AND REGULATIONS GOVERNING THE HYGIENE AND SANITATION OF SCHOOLHOUSES.

I. INTRODUCTION.

This bulletin reviews the standards that are set to-day in the different States concerning the physical environment to which the child is intrusted by compulsory attendance upon public schools. The school endeavors to instruct the child how to avoid ills of various sorts; the State, through inspection, is barring from the school those persons who may be a source of danger to others—these are facts that need not at present concern us, though they afford scope for a volume. This bulletin is confined to the hygienic provisions regarding the school site and the school plant.

There are difficulties in the way of a satisfactory treatment of this subject; some of them should be noted at the outset. The school codes of many States omit some of the laws bearing on school sanitation. These omissions can only be discovered by a careful scrutiny of the statutes. At the same time it is impossible to tell what shall be to-morrow. Various executive authorities, clothed with different degrees of power relative to control of school environment, are competent to act at any moment. State departments of education, State and local boards of health, fire marshals, factory inspectors, district police, etc., are some of the agencies charged with authority to make and enforce regulations carrying all the weight of statutory law. The courts, on the other hand, are competent to review these laws and rulings, and have already in several of the States handed down important decisions bearing upon school hygiene.

Increased facilities for communication and the similarity in ideals of the people of the different States have occasioned gigantic strides in the last few years in the legal and administrative control of school hygiene. Probably nine-tenths of the existing regulation of this sort has come within the last decade. The movement continues largely by a process of imitation and adaptation. Each State profits by the experience of 47 others. A law passed in one extreme of the country to-day is copied next month or next year by a State two or three thousand miles distant.

As a consequence of the way laws accumulate and administrative authority is exercised, there will be noted some contradictions and

many duplications in law, much of vagueness in administrative regulations, and some conflict in administrative authority. The last is by far the most serious difficulty. It is due for the most part either to reluctance on the part of legislatures to delegate power and provide penalties, or to the fact that the administrative officer is dependent for his reelection upon a more or less temporary popularity.

Illustrations will make this plainer. The superintendent of public instruction[1] in one State writes: "While the law requires that the plans (of all school buildings) be approved, the methods of enforcing such approval are rather meager." Reference to the State law reveals that there is no penalty whatever for violations. The State superintendent of Utah complains that the law establishing a State schoolhouse commission for the approval of building plans in that State is not effective because no appropriation has been made to meet the expenses of the inspection necessary to satisfy the commission that the plans and specifications are executed as approved.[2] By authorization of law the department of public instruction in a certain State has established requirements for ventilating rural schools that expect a bonus from the State. Additional recommendation and discussion of ways and means are embodied in a circular issued to school officials. With a view to discovering how much was recommendation and how much requirement, a blank entitled "County Superintendent's Inspection Report" was secured, and upon it were noted such replies to the various queries as a leading official of the State Department felt would constitute the minimum for the granting of the bonus. The circular of the State Department says that "the chimney built for the outlet must be at least 16 by 16 or 12 by 24 inside measurement"; yet a favorable report is made on applications giving 12 by 12 as the inside measurement. The fresh-air intake "should be at least 14 inches in diameter," but in practice 12 inches is accepted, with a foul-air outlet of equal size, though the State circular reads: "The foul-air outlet must be larger than the fresh-air intake." Complaint was made unofficially by a member of this department that county superintendents are too dependent upon local good will to be ideal inspectors. They are disposed, in some instances, to get as much money as possible for their schools regardless of conditions.

It is neither possible nor desirable in the following pages to introduce the multiform difficulties and uncertainties that the subject offers. It will be necessary to be liberal in recognizing recommendations as requirements. The State requirements are presented in the language of the original as nearly as terseness and exactness permit; requirements set up by smaller administrative units have

[1] For convenience the term "State superintendent" will hereafter be used in referring to the chief educational officer of any State not having a commissioner.

[2] Ninth Rep. Supt. Pub. Instr., Utah (advance sheets), pp. 13–14.

been disregarded and attention focused mainly on the provisions of the different States.

Facts germane to this subject might be presented in a variety of arrangements. All data might be arranged geographically, showing first what are the regulations regarding school hygiene in Alabama, then in Arizona, then in Arkansas, etc. Such a procedure would be of some interest and merit from its possibility of holding up to scorn certain States and adding new laurels to the already widely heralded prestige of others. The data, on the other hand, might be arranged to show whether, in the establishment of standards, reliance is placed upon law or upon administrative agents. However, the fundamental interest of the educational public is in the standards of school hygiene, not where they obtain or by whom promulgated. For this reason the entire subject has been divided into a number of general topics, and under these the States are considered in alphabetical order.

An arbitrary scheme of notation has been employed in the table covering these topics. While such a presentation involves some disadvantages, in no other way can so much of detail and yet so correct a general impression be caught at a single glance.

1. Regulating authority:
   - Statutory (legislative enactments)=L.
   - Judicial (decisions in common or statute law)= J.
   - Administrative (rules of State departments of education, health, etc.)=X.
2. Enforcing authority:
   - Educational—
     - State=A.
     - County=B.
     - Town=C.
     - District=D.
   - Health—
     - State=A′.
     - County=B′.
     - Local=C′.
   - Fire or factory inspectors, etc.—
     - State=A″.
     - Local=C″.
3. Character of regulation:
   - Mandatory=m.
   - Permissive=p.
   - Encouraged by financial aid=e.
4. Extent of application:
   - State wide=a.
   - Outside certain classes of cities=b.
   - Consolidated district only=c.
   - Rural districts only=d.

After each table appears a brief discussion of the facts of the table, including certain supplementary material that does not lend itself to the tabular form. Before reaching a conclusion as to any given regulation, the reader should consult the discussion as well as the table.

II. GENERAL CONTROL EXERCISED BY THE STATE.

By lodging with the several administrative officials powers of advice, approval of plans and equipment for school buildings, inspection and even condemnation of plants in operation, the State has made large extensions of its control over school environment. Advice is hardly a form of control; nevertheless, it constitutes the entering wedge of something more effective. Moreover, the function of advice is greatly strengthened when it is made legal, because the same act of the legislature that authorizes advice often sets aside a sum for the performance of the work. Table 1 summarizes the general situation regarding powers of advice, approval, inspection, and condemnation or correction.

Forty of the States have taken some legal action to limit the local officials regarding hygienic precautions in erecting school buildings. The States that appear not to have taken legal steps in this direction are Arizona, Colorado, Georgia, Illinois, Missouri, Nebraska, New Mexico, and Tennessee. It does not follow that the State departments of education in these eight States are indifferent or even inactive with regard to the condition of schoolhouses. Through annual reports, circulars, and pamphlets, and the granting of certificates or commissions to "model schools," etc., all possible moral suasion is put into play.

TABLE 1.—*General control exercised by the State without definite standards.*

[For explanation of symbols, see p. 7.]

States and references.[1]	Advice.	Approval.	Inspection.	Inspection combined with condemnation (or correction).
Alabama: School Laws, p. 114	.....	LAed	.....	LA'pa.
Arkansas: Acts of 1911, No. 472	.....	.....	.....	LBpb.
California: School Law, subdivision 11, sec. 1543; also sec. 1546.	.....	LBmb	.....	
Connecticut: Rev. Stat. of 1888, sec. 2185. Laws Relating to Schools, sec. 249.	.....	LCma	.....	
Delaware: Laws of Delaware, ch. 327, vol. 22; School Laws, p. 10.	.....	.....	LA'pa	LBpe.
Florida: Gen. Stat., sec. 1120; Acts of 1909, ch. 5931.	.....	.....	.....	LA'pa.
Idaho: Rule State Bd. of Ed., Handbook of Inf. for Trustees, p. 45; School Laws, p. 5; Laws of 1909, House Bill, No. 171; Rules State Bd. of Health.	.....	XAma	LApa; LB'ma	XA'B'C'pa.
Indiana: Burns' Annotated Statutes, Revision of 1908, sec. 7594; Reps. State Bd. of Health, various years; Blue *v.* Beach, 155 Ind. 121.	.....	.....	LA'pa Jpa	XA'pa.
Iowa: School Laws, p. 65; Fifteenth Bien. Rep. State Bd. of Health, p. 39; Code of Iowa, sec. 2568.	.....	LBma	XC'ma	LC'pa.

[1] Where it has been necessary to give more than one reference under a State, the citations are arranged very nearly as they give the data of the columns following from left to right.

Interpret according to the scheme laid out on pp. 5–6 preceding, by reading, for example: In Alabama, the State education department must approve plans for rural districts before State aid can be extended; or again, in Louisiana, plans for all new schoolhouses must, according to a rule of the State board of health, be approved by the State education authority and the parish (county) education and health officials. The law also gives power to the State health authorities of Louisiana to inspect all schoolhouses.

TABLE 1.—*General control exercised by the State without definite standards.*—Continued.

States and references.	Advice.	Approval.	Inspection.	Inspection combined with condemnation (or correction).
Kansas: Laws Relating to Schools, p. 90.	.....	L (State architect) ma.	.....	
Kentucky: Rule State Bd. of Health, Rep. State Bd. of Health, 1908–9, p. 194; School Laws, pp. 19, 25.	.....	.....	.....	XC'ma; LBma.
Louisiana: Rule State Bd. of Health; School Laws, p. 124; Rev. Stat., sec. 3063.	.....	XA'ABB'ma...	LA'pa.....	
Maine: Laws of 1909, ch. 88.....	LApa.....	LAA'ma.....	.....	
Maryland: School Laws, pp. 21, 46.	.....	LBmb.....	.....	
Massachusetts: Acts of 1913, ch. 655; Laws Relating to Pub. Instr., pp. 114–118.	.....	LA"ma.....	L (medical inspectors) ma; LA'pa.	LA"pa.
Michigan: School Laws, p. 177; Rule State Bd. of Health, Public Health, Jan.–Mar., 1910, p. 47; Laws of 1911, No. 255.	.....	.....	.....	LA"pa; XA'ma (county truant officer) pa.
Minnesota: State Health Laws and Reg., May 1, 1912; Bul. No. 40, Dept. Pub. Instr.; Rev. Laws of 1905, sec. 2131; Gen. Stat. 1913, sec. 2874, 2691, 4640 (6); Rules, Dept. of Ed., 1915, Bull. 56.	.....	LXAmaec; XA.	.....	LApa.
Mississippi: Code of 1906, sec. 2513–2514; School Laws, 1914.	.....	.....	LA'ma.....	
Montana: Laws of 1913; Rev. Code, 1907, sec. 1483; Rule State Bd. of Health.	LA'md.....	LAA'ma.....	.....	LXC'ma.
Nevada: School Code, p. 26.....	.....	LAma.....	.....	
New Hampshire: Pub. Stat. in force Jan. 1, 1901, p. 338.	.....	.....	.....	LC'pa.
New Jersey: School Laws, pp. 72–73, 195.	LAma.....	LAma.....	X (medical inspectors) ma.	
New York: Education Law, secs. 451–453, pp. 102–103.	.....	LAmb.....	.....	LBpb.
North Carolina: School Laws, pp. 56, 102.	.....	LABma.....	.....	LBma.
North Dakota: School Laws, pp. 30, 103, 104, 105; Laws of 1913, ch. 6 and 263, House Bill, No. 378.	LABB'ma..	LAeb; LAma ..	.....	LABB'ma.
Ohio: State Bldg. Code of 1911; Code of 1910, sec. 4424; Laws of 1910, pp. 395–397.	.....	LA'B'C'A"C"ma	.....	L (State inspectors of plumbing) C'pa.
Oklahoma: Rev. Laws, sec. 6788...	.....	.....	.....	LA'ma.
Oregon: General Laws, sec. 3999....	.....	LBmb.....	.....	
Pennsylvania: School Code, pp. 42, 52–53; Act of Apr. 27, 1905.	LAma.....	LAmb.....	.....	LA'pa; LAea.
Rhode Island: Laws of 1911, ch. 725.	.....	LAma.....	.....	
South Carolina: School Law, pp. 26–27, 40–41, 63; Acts of 1912, No. 419.	.....	LABea.....	.....	LA'pa.
South Dakota: School Law, secs. 32, 237.	.....	LAma.....	.....	LBpa.
Texas: Law effective July 1, 1913; Rev. Civil Stat., arts. 2756, 4529.	LAma.....	LBDma.....	LA'pa.....	
Utah: School Law, pp. 29–30; Compiled Laws, 1907, sec. 174, 1104x–1104x3, 1113x18–1113x20.	.....	LAA'mb.....	.....	LA'C'pa.
Vermont: Pub. Stat., sec. 1513, 1516–1518.	LA'm.....	LA'ma.....	LA'ma.....	LA'pa.
Virginia: School Laws, pp. 42–43, 44.	.....	LBma.....	.....	LBpe; LA'pa.
Washington: School Laws, pp. 33, 51, 61, 69; Codes and Statutes, sec. 4532.	.....	LBmb.....	.....	
West Virginia: School Law, pp. 14, 43, 63; Code, secs. 2050, 2051.	L (medical inspector) pa.	LBma.....	LBma.....	
Wisconsin: Laws relating to schools, pp. 89–91, 142, 229–230, 230–231; Laws of 1901, ch. 225; Laws of 1913, ch. 30.	LAma.....	LBma; LAe....	LC'ma.....	LABea.
Wyoming: Compiled Stat., 1910, sec. 2941.	.....	.....	.....	Lma.

A. ADVICE.

All of the States that have empowered officials outside of the district to give advice have backed up this advisory authority with stronger prerogatives. In one State the advisory work is shared by the county superintendent; in one by the local medical inspector; in one by the county superintendent of health; in two by the State board of health; in six by the State education department, i. e., by the State superintendent or commissioner of education or by the State board of education. In Montana advice is given to rural districts only. In Vermont the State board of health advises with municipal officers regarding the construction, heating, ventilation, and sanitary arrangements of public buildings, construed as including public school buildings. In certain other States advice is given to districts of all classes. The advice, except in Vermont, West Virginia, and possibly Texas, consists in the preparation of plans for buildings and the loan of the plans to districts desiring them. In Maine, New Jersey, Pennsylvania, and Wisconsin specifications are prepared and lent. In three of the States that prepare plans the State superintendent may furnish the necessary details for large as well as small buildings, but in Maine and Wisconsin a four-room structure is the limit, while in North Dakota the superintendent has no authority to go beyond two rooms. The duty of giving advice is usually mandatory with the officials upon whom it is conferred, but in Maine the law is evidently permissive, since the State superintendent sets forth no standards and in a recent letter speaks only of approval. In West Virginia the local medical inspector, "when requested by the board of education," shall assist in formulating rules of procedure on matters pertaining to the lighting, heating, ventilating, and sanitation of the school buildings. It is evident that the purpose of advice is the protection of smaller and poorer districts against their own ignorance or the exploitation of persons from without.

B. APPROVAL.

Classes of officials utilized.—The power of approval of plans is a species of control more generally exercised and more potent in effects than the power of advice. Table 1 shows that the power of approval has been practically taken from the lay authorities in at least 30 States. The function of advice is exercised in all cases directly under *legal* warrant, but in 3 out of 30 States the power of approval finds its authority specifically in the administrative ruling of the State board of health or of the State board of education. Approval, like advice, comes most frequently from the hands of education officials. In 21 out of 30 cases these officials are the sole authority in approval; in 1 case the health authority acts alone; in 1 case the State archi-

tect; in still another a supervisor of plans in the building inspection department of the district police; in 5 cases health and education officials cooperate; and in 1 case, (Ohio), the health officials share their responsibility with several others.

Degree of centralization.—So far as the health authorities are concerned, it is nearly always the State boards of health that have jurisdiction, local boards working under their direction. With the education officers the tendency toward centralization is not so marked. Of the 21 States where the education officers act alone, in 9 the State department of education is in full charge; in 7 the county superintendent, county school commissioners, or county board of education approves. In the 5 others, State, county, town, and district officers are variously combined. In North Carolina the State superintendent has the power of initial approval, but before the building can be paid for it must be inspected and approved by the county superintendent. In South Carolina both the State and county boards of education must approve plans before aid can be received from the county schoolhouse fund. In Maine and Montana the State superintendent and the State board of health cooperate under certain conditions. In Maine both must approve plans if other than those prepared by the State department are used. In Montana there is cooperation except in districts of the first class, i. e., those containing the larger cities. In these districts the board of health may act alone. In Texas county superintendents approve plans in common school districts and in independent districts having fewer than 150 scholastics, while local superintendents approve in others. In Louisiana three officers—the State superintendent, the parish superintendent, and the parish health officer—must approve all plans as to hygienic requirements. In Minnesota all matters relating to schoolhouse sanitation were transferred in 1913 from the State board of health to the State department of education, and definite powers lodged in the State superintendent of education. West Virginia's new law (1915) creates a State department of health, with greatly enlarged powers including a public health council which will have direct oversight of State sanitation, etc.

The Ohio State building code.—While Ohio's State building code of 1911 is a most exhaustive piece of legislation, it is not retroactive in any of its features. It does not mention condemnation of existing buildings, and in this respect is below the standard of many other States. Further; it does not provide for legal approval or advice, but it does charge specific officials, State and local, with the enforcement of specific requirements of the code, e. g., the State fire marshal *or* municipal fire chiefs enforce all provisions relative to fire prevention; building inspectors or officials, State *or* local, have similar responsibility touching heat and ventilation, while health officials,

State *or* local, look after sanitary plumbing. It will be noted that there is possible division in responsibility on the one hand or friction in authority on the other. Both those who have control of school buildings and those engaging or assisting in the construction, alteration, or repair of such buildings are under heavy penalties.

Title 3, Part 2, of the Ohio Code deals with school buildings only, but so defines the term as to include libraries, museums, and art galleries; or, as the law states, "all buildings or structures containing one or more rooms used for the assembling of persons for the purpose of acquiring knowledge or for mental training." (Sec. 1.) School buildings are considered, however, under two classes or grades, grade A applying to "all rooms or buildings used for school purposes by pupils or students 18 years old or less." When Ohio requirements are subsequently referred to, grade A alone is meant.

It is unnecessary to reproduce all the detail of the code itself in defining its standard requirements.[1] Many of the precautions are less hygienic than practical in their bearing, and are designed to guard against future trouble and expense. They are, moreover, often too technical to be understood except by an architect or mechanic.

Territorial extent of power of approval.—The extent to which approval of plans may go territorially varies widely. In a majority of the States this approval applies to all districts, but several exceptions must be noted. In California incorporated cities with boards of education are autonomous in this particular; in Maryland the city of Baltimore governs this matter for itself; in New York the cities of the first and second classes are exempt from interference; in Pennsylvania cities of the first class. In Utah the exemption applies to cities over 5,000, but the State superintendent believes that the larger cities should be brought under the operation of the law.[2] In Oregon and Washington only districts of the third class, i. e., the most sparsely populated districts, need wait for approval.

The premium placed by State aid.—In Alabama, State aid toward building rural schools is conditioned on approval of plans by the State superintendent. In Minnesota all plans of school buildings must have the approval of the superintendent of education, and the statutes provide that consolidated schools may receive building aid up to one-fourth the cost of the building, but not exceeding $2,000. The annual aid received by all classes of schools is also made contingent upon attaining certain definite standards with respect to buildings, mechanical equipment, furniture and apparatus. In South Carolina all schools are eligible to aid on a building project up to $300 if the plans are approved. The scale of aid is $50 for

[1] Given in Bu. of Ed. Bull., 1913, No. 52, "Sanitary Schoolhouses. Legal requirements in Indiana and Ohio." Washington, Government Printing Office, price 5 cents.

[2] Ninth Report of Supt. Pub. Instr., Utah (advance sheets), pp. 13–14.

each $100 raised by the district itself. High schools and rural schools continue to enjoy State aid if conducted in a comfortable and sanitary building. In Wisconsin and North Dakota a second and higher scale of requirement is prescribed for schools that expect State aid. This bounty in North Dakota may run as high as $600 annually for "a suitable building, properly lighted, heated, and ventilated." The State superintendent, by virtue of a previous similar law, issued a pamphlet[1] setting forth standards to be maintained in passing upon requests for aid, but the new authority is the State board of education. Exercise of the function of approval is mandatory in every case except the four or five where aid is used as a lever.

Approval of equipment.—Approval applies to school buildings in all the 30 States and to equipment in 3. In Maryland every schoolhouse must be built "and furnished" according to plans and drawings issued from the office of the county school commissioners. In Michigan, "(1) before any schoolhouse or addition can be erected by a district, plans and specifications of the same must be submitted for approval to the superintendent of public instruction; (2) the superintendent of public instruction shall have authority to inspect and condemn schoolhouses that are not in a safe and sanitary condition." In Washington the county superintendent's consent must be obtained before a third-class district can purchase any maps, charts, or apparatus.

Approval of repairs and alterations.—So far as the buildings themselves are concerned, new structures, and sometimes the alteration of old ones, come within the province of the law. In Montana an expense of over $500 in enlargement or repairs calls for the same formalities as an entirely new building. In New York the same limit, $500, is placed on all districts outside of cities of the first and second classes, unless the approval of the commissioner of education is secured. The New Jersey law prescribes that "no public school or part thereof shall be erected until approval is given." Texas has met the difficulty and largely solved it through the power of the county superintendent to approve all vouchers drawn against the school fund of the county.

Exceptions for certain types of buildings.—In several States exceptions to the law concerning approval of plans are made for certain sorts of buildings. In Alabama the law affects only rural schools; in Kansas only those over one story high; in Texas only buildings costing over $400; in Utah only buildings costing over $1,000; in Wisconsin only buildings of four rooms or less.

Weaknesses in the power of approval.—The column headed "Approval" in Table 1 should be taken with some reservation. Besides

[1] State Aid to Consolidated, Graded, and Rural Schools.

weaknesses previously noted in the enactments and executive machinery of some of the 30 States, there is a question as to whether Pennsylvania, Rhode Island, and Connecticut should be listed at all. The Pennsylvania statute provides that in certain districts no contract can be made for a building until "plans and specifications have been submitted to the State board of education, and any recommendations concerning the same by the State board of education have been laid before the board of school directors." The law appears to be advisory; but in justice it should be said that succeeding sections lay down some very definite standards. The Rhode Island statute directs that the State board of education shall approve standards of lighting, heating, ventilating, seating, and other sanitary arrangements in schools and communicate the same to school committees. This, too, seems to be merely advisory. The approving authority in Connecticut lies with the board of school visitors, a lay body. Very few of the States have established penalties for the violation of this sort of statute, though in nearly all it would probably be possible to reach offenders on some such general charge as malfeasance or misappropriation.

An indirect advantage.—Provisions for approval naturally lead to the extension of the function of advice. The authorities in whom power of approval is vested have in at least four cases discovered the economy of issuing model plans, specifications, or building codes for the guidance of architects and school boards. The Massachusetts inspector of buildings has prepared a sheet setting forth certain requirements in heating and ventilation of schools that must be complied with before plans can be approved; and the State board of education in New Jersey has adopted a fairly comprehensive building code. The State superintendent of North Carolina has issued pamphlets containing plans that will be accepted as satisfactory, and the State board of South Carolina has acted similarly.

C. INSPECTION.

Under the column headed "Inspection," in Table 1, have been grouped those arrangements for inspection of hygienic conditions where there is no delegated power to order correction. Since this duty in the 12 States represented has been placed almost entirely with health officials, another common function of health boards has been included under "inspection," viz, the right to frame sanitary codes. The power to frame and enforce sanitary codes has been placed in the last column of Table 1. The duty of inspection is mandatory in the case of Idaho, Iowa, Massachusetts, New Jersey, West Virginia, and Wisconsin, and is in the hands of county or other local officers. In Massachusetts State health officers also may inspect schools. The power to frame sanitary codes is optional and is lodged with the State health authorities in Delaware, Indiana, Louisiana, and Texas.

In Mississippi the State board of health *shall* prepare a general sanitary code; in Vermont it *shall* issue to local boards of health its rules regarding lighting, heating, and ventilation of school buildings and cause schoolhouses to be inspected in these particulars.

While these arrangements seem to be purely advisory in some States, in others public sentiment and the courts have given them considerable significance. In several States the State board of health has become *the* force in the hygienic improvement of schools. Such is notably the case in Delaware, Louisiana, Indiana, and Vermont. This has not been accomplished, however, without a struggle. The judicial trend is well summed up by the supreme court of Indiana in the case of Blue *v.* Beach et al. (155 Ind., 121). The following is the language of the court: "When these boards adopt rules and by-laws, by virtue of legislative authority, such rules and by-laws * * * have the force and effect of a law of the legislature."

Again:

> The powers conferred upon them by the legislature, in view of the great public interests confided to them, have always received from the courts a liberal construction, and the right of the legislature to confer upon them the power to make reasonable rules, by-laws, and regulations is generally recognized by the authorities.

D. INSPECTION AND CONDEMNATION (OR CORRECTION).

Strong and weak types of laws.—As the power to approve stands above the power to advise concerning new buildings, so the right to condemn or correct stands above the right to inspect old buildings. A little over half the States of the country have taken some sort of action to compel remedial measures where they are needed. The laws looking to this end are of all degrees of completeness and stringency. An illustration of the weaker type is that of Wyoming. It says in effect that managers of all public places and institutions, schools specified among others, shall remedy the sanitary defects called to their attention. Presumably the health authorities are the ones to call attention to defects. There are no penalties; no enforcing authority.[1]

At the other extreme, perhaps, stands Wisconsin, handling the situation through education officials. The law reads: "The inspector of rural schools, the inspector of State graded schools, and the inspector of high schools of the State * * * are hereby made inspectors of public school buildings," under the direction of the State superintendent. Any school official, member of board of health, or even voter of a school district may complain in writing to the State superintendent

[1] In Wyoming the State superintendent, "realizing the weakness of the laws regulating type of school building, has issued general circular letters to trustees and personal letters to all the school boards contemplating the erection of new buildings, offering help in drafting plans. The State department of education publishes illustrated bulletins for circulation, giving specific suggestions in regard to school buildings standard for rural and village schools of one or more rooms." (Letter from State board of health, May 15, 1915.)

of the insanitary condition of his local school or its actual imperilment of life or limb of attendants. Upon receipt of such complaint the State department shall assign one of the inspectors mentioned above to make a personal inspection. The inspector shall report to the officials in charge of said school, ordering the repairs that in his judgment are necessary, or stating that the building should be replaced by a new one. A copy of the report is also to be filed with the State superintendent, to whom an appeal may be made by the district officials concerned. Unless the order of the inspector is complied with in the specified time or is reversed by the State superintendent, the district in question shall forfeit its entire share of the general seven-tenths mill tax of the State for school purposes. Or the county superintendent may condemn any schoolhouse, the offending district to lose its share of the school fund income until conditions are made satisfactory. The State superintendent, however, may on appeal review and reverse the decision of the county superintendent. The county superintendent may also direct district boards to make any repairs or alterations which, in his opinion, are necessary to health, comfort, or progress of the pupils, provided that the cost of the same does not exceed $25. The Wisconsin law has resulted in the condemnation of a number of buildings.

Combinations of authority.—There are few combinations of authority in the matter of inspection and condemnation. In Kentucky, Michigan, North Dakota, Pennsylvania, and Virginia both health and education authorities have power, but they act independently, except in North Dakota, where a complicated system is in operation. A law of 1913 in that State reads that the county superintendent of health shall enforce cleanliness in the schools and inspect overcrowded, poorly ventilated, and insanitary schoolhouses. Another law of the same year directs that when the county superintendent reports to the county board of health that any schoolhouse or outbuilding is unsafe or insanitary, the county board of health shall at once investigate and direct the school board to take such action as may be necessary. Another law empowers the State superintendent by his deputy to require any improvement in the sanitary or ventilating arrangements of the school building unless it entails unreasonable expense. Aggrieved parties may, however, appeal within 30 days to the local health officers, whose decision shall be final. In 5 States education officers alone have power to act, and in 13 health officials are supreme.

Degree of centralization.—Of the 5 States where education officers are in control of school health conditions, only 1, Wisconsin, gives the State education officers any voice; in the others control is vested in the county superintendent or a similar officer. Among health authorities the State boards exercise the primary influence, and local representatives work under their direction.

Sanitary codes.—Plenary power conferred upon State boards of health to make and enforce sanitary codes is no longer an uncommon thing. Thus the Minnesota State Board of Health may adopt and enforce regulations, which when approved by the attorney general and published have the force of law. Among the general subjects on which it may rule are "the construction and equipment in respect to sanitary conditions of schools * * * and other public institutions." Under this authorization numerous rules have been adopted regarding schools, and the State has found it necessary to enact but little specific legislation. In New York State district superintendents may condemn schoolhouses which in their opinion are "wholly unfit for use and not worth repairing." When an order is made, the district is required to vote an appropriation for a new building costing not less by 25 per cent than the amount specified in the order of the district superintendent. Such order is subject to review by the commissioner of education. The district superintendent may also order repairs and alterations to an amount not exceeding $200 in any one year.

Results in Indiana.—From the side of tangible results the Indiana State Board of Health has made an enviable record, and has merited the vote of confidence that was expressed in making it the executive authority of the sanitary schoolhouse law of 1911. Gathering encouragement from the pronouncement of the State supreme court in Blue *v.* Beach in 1900,[1] the board began a series of inspections which resulted in cases for condemnation coming before most of the quarterly meetings. A study of annual reports gives the following data, the extensions representing additional allowance of time to districts where buildings had been condemned:

Results of work of Indiana State Board of Health.

Years.	Condemnations.	Extensions.
1903	5	0
1904	7	1
1905	4	1
1906	16	0
1907	31	3
1908	32	3
1909	33	8
1910	38	3

Frequency of inspection.—The frequency of the inspections is usually left to the discretion of the inspectors. In Montana, however, a rule of the State board of health commands the local health officer to inspect every school in his district once "each school term" and to close it until any insanitary condition is abated. The county superintendent of health in North Carolina during the summer

[1] See p. 15.

months must make an examination of the sanitary conditions of every public school, and he may prohibit the resumption of work by withholding his certificate of approval.

Limitations of power to order corrections.—Power to order repairs is limited in several of the States. The Massachusetts inspector of buildings and the State superintendent of North Dakota are forbidden to make an order entailing unreasonable expense. In New York the district superintendent, an official corresponding closely to the county superintendent in other sections, may condemn entire buildings, but he can not direct repairs that will cost a school over $200 per year. His jurisdiction covers only districts of less than 5,000 inhabitants. In Vermont the State board of health is limit by the law of 1915 to 20 per cent of the grand list (1 per cent of valuation). The county superintendent in South Dakota is held to an expenditure of $50 per year, and the county superintendent in Wisconsin, as previously noted, may not expend more than $25. In Michigan the authority of the county truant officer reaches only the inspection and correction of defects in outbuildings, and a rule of the State board of health applies merely to the school surroundings; but the factory inspectors may condemn all school buildings that they consider liable to collapse or that endanger life. The latter statute is, of course, insufficient so far as ordinary sanitation is concerned.

Penalties.—Penalties vary widely in their severity and nature. In Delaware, Pennsylvania, Virginia, and Wisconsin the district is made to suffer by losing its share in the apportionment of State or county school funds. In North Dakota a fine of $100 to $1,000 may be imposed, and two other States place a lower figure. In Ohio the penalty is definitely personal; the official may be fined or imprisoned, or both.

Comprehensiveness of the Kentucky statute.—The Kentucky law is noteworthy in that it provides that the county superintendent—

> shall condemn any schoolhouse which is dilapidated, unhealthy, or otherwise unfit to be occupied for the purpose of a common school, and any fence or other inclosure of a schoolhouse, when such inclosure is for any reason insufficient for the protection of the house or ground. He shall condemn all school furniture or apparatus, insufficient in quantity, or not of the required character, order the same replaced with the proper furniture or apparatus—

and notify the trustees of his decision. These large powers are backed by authority to suspend or remove any trustee for neglect of duty.

III. THE SCHOOL SITE.

Factors affecting the school site and its surroundings are set forth in Table 2. Provision for playgrounds is included also, together with facts that affect the accessibility of the school to its pupils. Accessi-

bility is governed mainly by provision for transportation and by size of district. The former has been included only often enough to show the trend in opinion as to how far a child ought to walk; the latter has not been regarded, since many of the boards have the right to establish as many schools in the district as they deem proper.

In general it may be said that all directions in this section are mandatory, except that a few States allow option with regard to transportation. Furthermore, some latitude is allowed district boards between the maximum and minimum requirements as to size of school site. Nearly all the provisions are State wide in their application, and there is a tendency to make the provisions of the act apply also to private and parochial schools. The term "private" or "parochial" is found in the statutes of Florida, Massachusetts, Rhode Island, South Dakota, Tennessee, Vermont, and Wisconsin. The Massachusetts law defines a schoolhouse as "any building or part thereof in which public or private instruction is afforded to more than 10 pupils at one time." Other States use the word "school" in a general way and do not specify its character. The names of 36 States appear in the table, 8 in the regulation of miscellaneous matters with reference to school site, 18 with reference to the proximity of various nuisances, 18 with reference to availability of site through transportation or other devices, and at least 25 with reference to size of school site.

TABLE 2.—*The school site.*[1]

States.	References.	Proximity of nuisances.	Availability of site.	Size of site.	Miscellaneous.
Alabama	School Laws, p. 114			×	
Arkansas	Digest of Stat. (1905), sec. 5129; acts of 1905; acts of 1913.	×			×
Colorado	School Laws, p. 193		×		
Connecticut	Laws of 1907, ch. 200 (81 Conn., 276); acts of 1911, ch. 173; Gen. Stat., sec. 4070, 4114; acts of 1913.	×	×	×	×
Delaware	Sixteenth Bien. Rep. State Bd. of Health (1908–1910), p. 72; School Laws, p. 26.	×		×	
Florida	School Laws, pp. 17, 49, 118	×	×	×	
Indiana	School Law, pp. 134, 150, 188, 201. U. S. Bu. of Ed. Bull., 1913, No. 52, p. 10; acts of 1913.	×	×	×	×
Illinois	Acts of 1913				×
Iowa	School Laws, pp. 61, 85, 103, 107, 130, 267, 312, 323; acts of 1913, ch. 193.	×	×	×	×
Kansas	School Laws, pp. 66, 74, 84, 175		×	×	
Kentucky	School Laws, p. 56; Stat., 1909, sec. 4439; School Laws, 1914, p. 5.	×	×	×	×
Louisiana	Const. and Rev. Laws, 1904, p. 397; amendments to same, 1904–1908, p. 146; School Laws, pp. 59, 126–127.	×		×	×
Maine	Laws of 1909, ch. 148; School Laws, pp. 4–5		×	×	
Maryland	Laws of 1912, ch. 532; School Laws, 1914			×	×
Massachusetts	Acts of 1906, ch. 104; Rev. Laws, 1902, ch. 25, sec. 47; acts of 1908, ch. 513; acts of 1910, ch. 508; acts of 1913, ch. 655, sec. 15, 40, 41.	×		×	
Minnesota	Rev. Laws, 1905, sec. 1533; State Health Laws and Regulations, p. 52; acts of 1913, chs. 415, 507; Gen. Stat. 1913, sec. 2874; Rules of Dept. of Ed., 1915, Bull. 56.	×	×	×	×

[1] So great a diversity exists in the provisions of this table that it has been deemed unwise to attempt to show by it anything as to the character of the regulation itself. "×" signifies some sort of regulation and the column headed "References" gives all sources of information for this section.

TABLE 2.—*The school site*—Continued.

States.	References.	Proximity of nuisances.	Availability of site.	Size of site.	Miscellaneous.
Mississippi	Laws of 1910, ch. 124		×		
Missouri	Laws of 1911, Senate bill 403; Laws of 1913, Senate bill 241.		×		
Montana	Laws of 1913		×	×	
Nebraska	School Laws, pp. 87, 88			×	
Nevada	School Code, p. 66; Rev. Laws, 1912, sec. 6534; 119 Pacific, 770.	×			
New Hampshire	School Laws, pp. 30, 34–35; Fogg *v.* Bd. of Ed. of Littleton (not yet in printed court reports); Laws of 1911, ch. 46.	×	×	×	×
New York	Liquor Tax Law, sec. 23, subd. 2	×			
North Carolina	School Law, p. 59			×	
North Dakota	Laws of 1913, chs. 265, 267		×	×	
Ohio	Laws of 1910; House bills 264, 482; School Laws of 1914; Senate bill 9.		×	×	×
Oklahoma	Law of Mar. 20, 1911			×	
Oregon	Lord's Oregon Laws, sec. 2133	×			
Pennsylvania	Law of Apr. 13, 1911; School Code, p. 39		×	×	
Rhode Island	Laws Relating to Education, pp. 36, 78	×			
South Dakota	School Laws, secs. 122, 123; Laws of 1911, ch. 141; Bien. Rep. State Supt., 1910–12, p. 151.	×	×	×	
Tennessee	Annotated Code, 1896, secs. 6795–96; acts of 1913.	×			×
Texas	School Laws, pp. 92, 93				×
Vermont	Pub. Stat., 1906, sec. 5122; Regulations State Bd. of Health.	×	×	×	×
Virginia	School Laws, pp. 42, 139; Laws of 1910, ch. 264; Laws of 1914, ch. 166.			×	×
Washington	Codes and Stat., sec. 4425, 4492; State *v.* Sup. Ct. Chelan Co.			×	×
West Virginia	State *v.* Bd. Ed., Clarksburg, Sc. Dist.				×
Wisconsin	Supplement to Stat., 1899–1906, sec. 1548; School Laws, pp. 173, 175, 256; Laws of 1909, ch. 318; acts of 1913.	×	×	×	×

Proximity of nuisances.—The desire to protect schools against nuisances in the neighborhood has most often expressed itself in laws removing liquor-selling to a distance. The creation of a "dry" zone around schools has become linked with a consideration of other nuisances in only two States. In Iowa no bills, posters, or other advertising matter of liquor and tobacco shall be distributed, posted, or circulated within 400 feet of premises used for school purposes. In Louisiana many special laws have been passed removing gambling and liquor-selling from 3 to 8 miles from schools, but the schools affected are chiefly high schools and higher institutions.

The breadth of the dry zone depends principally upon whether urban or rural territory is involved. Three States—Minnesota, Tennessee, and Florida—deal with this matter only outside incorporated towns and cities. Minnesota fixes a zone of only 1,500 feet, but Tennessee practically wipes out the traffic in all except very sparsely settled districts by giving to all schools a dry zone of 4 miles radius.[1] Florida has the same provision as Tennessee, but largely nullifies it by a remarkable list of exceptions—hotels of over 25 rooms selling to guests only; incorporated social clubs selling to members only; places retailing liquors within 500 feet of incorporated towns; and saloons in towns of over 200 inhabitants where there is no other saloon

[1] Tennessee has since passed a State-wide prohibition law.

within 50 miles. Arkansas gives the right to the majority of adult inhabitants residing within 3 miles of any school to secure from the county court, by petition, a dry-zone decree covering their territory. The legislature, however, has supplemented local option by passing acts creating dry zones of 3 to 6 miles radius around nine different schools in the State.

Nine other States have set limits upon the proximity of saloons to schools, but since the law applies to city as well as country, the distances set are much less. The distance is 200 feet in Connecticut, New Hampshire, New York, Rhode Island, and Vermont; 300 feet in Oregon[1] and Wisconsin, and formerly in Utah;[2] 400 feet in Massachusetts. South Dakota prohibits the sale of intoxicating liquor in the same block with any school or in any block adjacent to it.

Exceptions to the operation of these statutes are rather frequent and apply chiefly to hotels and renewals of license. In Connecticut the renewals are, however, subject to the discretion of the county commissioners. As a result of this law the supreme court of the State was called upon in October, 1908, to pass on the appeal of John Schusler from the decision of the county commissioners of Hartford County in refusing to renew a license for a location at which he had been retailing liquor for the past 10 years. The refusal of the commissioners was based upon the fact that a parochial school had been opened about a year previous on a site only 75 feet from the appellant's place of business. That the said commissioners had granted a renewal in another case within 200 feet of a school was held not to affect the present case. The following dictum of the court seems especially important: "It was of no legal consequence that the site for the school was bought years after the establishment of the appellant's saloon, in close proximity to it, and after his becoming the owner of the saloon property."

In New Hampshire hotels and drug stores occupied as such on January 1, prior to the passage of the "dry-zone" law, are not affected. New York exempts from the statute hotels and saloons established prior to March 23, 1896, or established prior to the occupation of any premises within 200 feet for church or school purposes. Rhode Island exempts taverns; Vermont, drug stores and inns. In Wisconsin the use of retail liquor licenses is prohibited except in buildings where such a license was in effect on June 30, 1905. Even then, after two and a half years had passed from the time the law went into effect, a remonstrance signed by a majority of the parents or guardians of children enrolled in any public or parochial school was sufficient to prevent any license from being issued to permit business within 300 feet of said school. This

[1] Oregon has since passed a prohibition law, and the entire State will be dry after Jan. 1, 1917.
[2] Repealed by ch. 106, Laws of 1911.

remonstrance can not affect drug stores, hotels, and restaurants established and maintained as such prior to February 1, 1905.

Turning from what is perhaps dominantly moral hygiene, there is noted less solicitude over the purely physical hygiene of the school site. A regulation of the Delaware State Board of Health forbids that any stable, pigpen, or other building liable to become a nuisance be placed within 200 feet of any schoolhouse or within 100 feet of the school yard. The Indiana law says there must be no steam railroads, livery stables, barns used for breeding purposes, noisy industries, or unhealthful conditions within 500 feet of schools;[1] the Rhode Island law states that no swine shall be kept or any other nuisance permitted within 100 feet of any schoolhouse or of any fence inclosing the yard of a schoolhouse; the Vermont Board of Health protects schoolhouses, if in a village, from noises and unsavory odors. The Minnesota Department of Education directs that no part of a school site shall be within 500 feet of steam railroads or manufacturing plants which may be sources of noise or smoke, swampy places, livery stables or other buildings which may be sources of unhealthful conditions. The New Hampshire statute runs:

> If any person shall use a building or place near a dwelling house or schoolhouse * * * for a slaughterhouse, a place of deposit of green pelts or skins, or for trying tallow, currying leather, or carrying on any other business that is offensive to the public, without the written permission of the health officers of the town, he shall forfeit $10 for each month such building or place shall be so used.

In Wisconsin no lockup or place of temporary confinement for insane persons or other persons under arrest shall be erected within 300 feet of a building used regularly or principally for school purposes. Nevada prohibits all resorts maintained for the purpose of prostitution within 800 yards of a school, on pain of a fine of $25 to $300 or imprisonment for 5 to 60 days, or both. The constitutionality of this law was attacked on several grounds in the case ex parte Ah Pah, but the supreme court of the State on December 30, 1911, upheld the enactment, with one qualification: That the 800-yard limit fixed by the school law should be reduced to 400 yards after January 1, 1912, by virtue of a clause in the crimes and punishments act.

Accessibility of school site.—The distance that a child may be expected to walk to school is different in different States. Most of the laws governing transportation have come with consolidation, but so many of these laws are permissive that differences in school sentiment have shown themselves plainly through this avenue. Transporting pupils to high schools is optional with Maine districts.

[1] The State board of health has defined "unhealthful conditions" specifically by demanding a zone of 500 feet radius about the school site to be free from "swampy ground, body of stagnant water, cemetery, slaughterhouse, fertilizer-reduction plant, any business or manufacturing establishment which engenders noxious odors or vapors or that pollutes the surrounding atmosphere by smoke or dust."

Any consolidated district in Mississippi, any special or village districts in Ohio, *may* arrange for transportation. Any district in New Hampshire *may* purchase vehicles for the purpose. Where the law is mandatory, it is often too indefinite. For instance, every Connecticut town in which a school has been discontinued, or in which a consolidation of districts has occurred, "shall furnish, whenever necessary, by transportation or otherwise, school accommodations so that every child over 7 and under 16 years of age can attend school." In Iowa, outside of consolidated districts, transportation is optional with the district for pupils living "at an unreasonable distance." The decisions of State Superintendents Riggs and Deyoe in the cases of Arnold et al. *v.* School Township of Richland, and Paine *v.* School Township of Amsterdam, have defined 1½ miles as the approximate limit of a *reasonable* distance. Consolidated districts in Colorado *may* transport pupils who live over 1 mile from school, and in Missouri any district *may* carry pupils who have over one-half mile to go. In Ohio no district is under obligation to haul a pupil living less than 1 mile from school. In New York the matter of transportation is within the discretionary control of the commissioner of education in the exercise of his appellate jurisdiction.

A half dozen of the States, however, have gone on record in a definite manner and with sufficient uniformity to suggest a conclusion. In consolidated districts in Kansas and Minnesota transportation is compulsory for children 2 miles from school. Missouri compels transportation of all children over 2½ miles from school in a consolidated district. Independent consolidated districts or central schools of townships in Iowa must transport every child living outside a city, town, or village. Parents or guardians may be compelled to carry children 2 miles to the line of school transportation and receive a reasonable compensation therefor. Where the township system has been adopted in South Dakota no child may be allowed to walk over 2½ miles, but the transportation must be furnished by the guardian at an amount graduated from 10 cents to 45 cents per day, according to distance traveled. Indiana has made a discrimination on the basis of the age of the pupil. When a school is discontinued, township trustees must arrange comfortable and safe transportation for all pupils living over 2 miles from school, but those between 6 and 12 years of age must be carried when they live over 1 mile away. An interesting decision recently came from the supreme court of New Hampshire in the case of Fogg *v.* Board of Education of Littleton, wherein it was decided that "it is unreasonable to expect or require" a boy 9 years of age to walk over 4 miles to school. . The action of the board in refusing to maintain a conveyance solely for the benefit of this boy was declared to be "unauthorized and illegal."[1]

[1] A summary of the laws on consolidation of schools is given in Bull. of the Bureau of Educ., 1914, No. 30.

The provision of Montana is that the site shall be "accessible"; Vermont says that it shall be as near the center of population as possible. The attitude of Florida is that schools shall not be closer to each other than 3 miles "unless for some local reason or necessity"—a phrase defined in the regulations of the State board of education to mean "unless made necessary by local geographical features." On the other hand Kentucky declares that no point on the boundary of a graded common-school district shall be over 2½ miles from the site of the proposed building. In Pennsylvania no pupil of an abandoned school shall be compelled to walk over 1½ miles. This implies liability of the district for transportation. In North Dakota the matter is settled by waiving the compulsory attendance requirement if it involves making a child walk over 2½ miles to school.

The distance of a child from school seems generally to be calculated by way of the nearest public highway. Of course it is taken for granted in such cases that the school property abuts on an open road; but this has not always been true. South Dakota has found it necessary to pass a law demanding that schools be situated upon a regularly laid out highway or upon a section line. In the latter case the presumption is that a road will soon be opened leading to the school. The Indiana board of health holds that "all schoolhouse sites shall be convenient of approach, either from a public road or street." Under the Wisconsin law the supervisors may be compelled to lay a highway to the schoolhouse; any trouble in the future has been guarded against by requiring that every schoolhouse site—

obtained by purchase or grant shall be located and established abutting on a public highway or street, and no schoolhouse shall hereafter be erected on any site unless at the time of erection of such the site shall abut on a public highway or street.

Size of the school site.—The size of the school site is subject to two general classes of limitations, maxima and minima. Some States have not invested their school boards with the power of eminent domain. Most have hedged it about with careful restrictions; a few have been very generous in bestowing it. For example, Connecticut boards may condemn as much land as is needed; Louisiana boards may condemn "space sufficiently extensive to answer the purpose of a schoolhouse and ground"; in Pennsylvania "no new school building shall hereafter be erected without a proper playground being provided therefor." The only trouble with these laws is that local boards are inclined to be too easily satisfied.

That maxima have been established so much oftener than minima possibly reflects a fear that through condemnation a citizen may be made to suffer too much in the interest of the State. In at least three States the maximum size of site is less in case of condemnation than otherwise it would be. Thus, in Nebraska a district may purchase 4

acres of the school lands of the State for a site, but it can not condemn over 1 acre. In Washington the corresponding figures are 10 and 5 acres, respectively. In Wisconsin "no schoolhouse site shall contain more than 4 acres unless with the consent of the owner of the land taken therefor." The absolute maxima in certain other States, with or without the exercise of eminent domain, is as follows: Delaware, one-half acre; Kentucky and New Hampshire, 1 acre; Kansas, 1½ acres; Massachusetts and South Dakota, 2 acres;[1] Maine, 3 acres; Maryland and North Dakota, 5 acres.

Sliding scales exist in some States. In North Carolina only 2 acres may be condemned to establish a new site, but if resorted to in order to add to an existing site the total site shall not ultimately exceed 3 acres. In Iowa 1 acre is the maximum except in city, town, or village, where one block may be used, and except in certain consolidated districts and townships that possess not more than two sites, where it may run to 4 acres, or even more under certain conditions. This last larger site must be on a public road and not within 30 rods of a residence, if the owner objects. In Virginia any school board may condemn not to exceed 1 acre in a town, or 5 elsewhere, "provided that no dwelling, yard, garden, or orchard shall be invaded, nor in an unincorporated town any space within 100 feet of a dwelling, nor in the country any space within 400 yards of a mansion house." Oklahoma boards can not condemn, but may purchase as high as 4 acres of the public-school lands of the State. In Illinois no tract of land condemned outside an incorporated city or village shall be within 40 rods of the dwelling of the owner of the land without his consent.

The minima for the different States run as follows: Delaware and Florida (outside villages and cities), one-half acre; Indiana, 1 acre; Alabama (for State aid on building), North Dakota, and South Dakota, 2 acres. In Montana rural schools shall have sites of not less than 1 acre; all others, not less than half an average city block. In Nebraska and Washington minima apply only to the purchase of State school lands for sites. In Nebraska 1 acre is the minimum; in Washington, 3 acres. In New York the commissioner of education may control the suitability of a site as to size by the exercise of his appellate jurisdiction. One decision is of interest, that of the Supreme Court of Washington, ruling that the condemnation of land adjacent to a school building for an athletic and play ground is a taking for "public use," and hence within the statutes of the State providing for the exercise of eminent domain. In Ohio a law provides State aid for elementary rural schools of three classes, the amount varying from

[1] In South Dakota schools giving courses in agriculture may purchase 10 acres for site and demonstration purposes.

$25 to $100 per annum. One of several conditions for each class of schools is the size of site, which ranges from 1 to 3 acres for organized play, school garden, and agriculture.

Public playgrounds.—Some of the States are partially discharging their responsibility through other bodies than school boards. In Indiana the board of health and charities in cities of the first class may establish, maintain, and equip public playgrounds and public baths, and may exercise the right of eminent domain; but all school playgrounds in the State must furnish 30 square feet for each pupil and be equipped with some apparatus. In New York school districts may acquire lands for public playgrounds and recreational purposes by vote of a district meetiog, and may levy a tax and issue bonds therefor. Massachusetts has thrown this matter by permissive legislation into the hands of towns and cities. Virginia cities with over 10,000 population may, as municipalities, acquire a playground for each race. Many similar laws indicate that most of our leading cities will soon meet the playground problem aside from the schools. In Minnesota the State Department of Education has made a rule that no elementary school shall be built upon a plot of ground that affords less than fifty square feet of playground per pupil. One hundred square feet per pupil will be required when conditions make it possible to secure this amount of land.

Miscellaneous regulations.—The barbed-wire fence is illegal in Connecticut and New Hampshire on or around a school site, and even within 10 feet of the site in Iowa. Drainage also is subject to regulation. Good drainage is required in Indiana, Louisiana, Texas, and Vermont. The Minnesota State Department of Education directs that all schools be situated "on high ground affording natural drainage;" made land or land impregnated with organic matter must not be selected. In New York sites not properly drained or insanitary because of proximity to swamps and lowlands or other unhealthful conditions may be discepted by the commissioner of education and the district be directed to acquire another site. The Texas and Louisiana State boards of health require that all schools be supplied with a sufficient number of garbage cans, kept covered and emptied daily. The State Board of Health of Vermont will not approve a site for a rural school unless it is protected from violent winds. The rules of the Minnesota Department of Education contain a suggestion well worthy of consideration. It reads: "To secure the best use of a site, it is recommended that not more than twenty per cent of the entire site should be used for the building, and that the building be so located that the entire frontage be at least twenty per cent of the site."

IV. THE WATER SUPPLY.

The common cup.—The most interesting point connected with safeguarding the water supply of schools is the spread in the last five years of the revolt against the common drinking cup.[1] For a number of years boards of health waged a campaign in this direction, but it was not until March, 1909, that any State took official action. Kansas was the pioneer, but other States followed rapidly, so that now over half of the entire number have either a law or a regulation regarding drinking cups. Schools may not be provided with common drinking cups without transgressing the law in Illinois, Kentucky, Maryland, Nebraska, North Dakota,[2] West Virginia,[3] and Wisconsin.[3] The State health authorities have forbidden the public drinking cup in Connecticut, Idaho, Iowa, Kansas, Louisiana, Massachusetts, Michigan, Minnesota,[4] Mississippi, Montana,[5] New Hampshire, New Jersey, Ohio,[6] Oklahoma, Oregon, Pennsylvania,[7] South Carolina, South Dakota, Utah, Vermont, and Washington.[8] In New York the common drinking cup in "public places or public institutions" is prohibited by regulation 3, Chapter VII, of the sanitary code. Jealous supervision of the powers of the State board of health has resulted in statutes delegating to the board the power to promulgate an order against common cups in Connecticut, Massachusetts, New Hampshire, and New Jersey. Colorado has a law that should practically put it in one of the above lists, the statute forbidding common cups unless sterilized after each use.

Several provisions that do not abolish the common cup regulate or limit its use. If public drinking cups are used in Texas, they, together with the water buckets or coolers, shall be scoured and sunned daily, or treated with a 2 per cent formaldehyde solution.[9] The Ohio law draws the line against tin cups or tumblers.[10] The Indiana[11] and Louisiana State boards of health require that sanitary fountains shall be installed in towns and cities where there is a public water supply; the same is required of Ohio schools hereafter constructed, without any specification as to water supply.

The common pail.—If, however, children were at liberty to dip their individual cups into the common pail, danger still would lurk in the water supply. Hence some attention has been given to the

[1] For full text of most laws and regulations in this field up to July 1, 1912, see *Common Drinking Cups and Roller Towels*, Pub. Health Bull. No. 57, issued by U. S. Pub. Health Service.
[2] Laws of 1913, ch. 228.
[3] Laws of 1913.
[4] Minnesota State Health Laws and Regulations, May 1, 1912, p. 54. Ch. 61, acts 1913.
[5] Bull. Dept. Pub. Health, Montana, vol. 6, No. 1.
[6] Rule adopted Jan. 22, 1913.
[7] Rule adopted Jan. 3, 1913.
[8] Rules of State Bd. of health, 1912, p. 19.
[9] School laws of Texas, p. 92. Rule State Bd. of health.
[10] State Building Code, Part 2, title 3, sec. 22.
[11] Bull. 1913, No. 52, U. S. Bu. of Ed., p. 15.

receptacle for the temporary supply. The Delaware State Board of Health does not permit any open bucket or vessel to be used for storing water in any school.[1] Open receptacles are barred by the State health officers in Idaho, Louisiana, and Oklahoma.[2] Minnesota has decreed against the common pail, and the Indiana law calls for covered tanks. In Vermont faucets must be attached to the water tanks.[3] If running water can not be had, the Virginia Board of Health allows a dipper to be used only for dipping water from the tank or cooler; the cup or glass used for drinking shall not be dipped into the water. The contents of the receptacle are to be renewed every morning, the receptacle, dipper, and drinking cup washed daily and scalded with boiling water once a week.[4] In Louisiana the containers must be scoured daily.

Source of supply, etc.—The source of the water and the disposition of waste are sometimes prescribed. In Indiana the supply of all schoolhouses must come from driven wells, or other sources approved by the health authorities.[5] Water from dug wells can not be used in Minnesota, but the schools must rely on the public supply, tubular or driven wells. Idaho, Indiana, and Oklahoma require that troughs or drains remove waste to a safe distance and that no pools or mudholes be left near wells.

The Ohio State building code is very specific. A gutter or drain of concrete or sewer pipe must be constructed to carry all waste water to a distance of 20 feet before discharging it. Pumps and hydrants shall be placed in the center of a concrete or cement platform at least 6 feet in diameter. This platform must be 6 inches above the natural grade line and then graded up to within 2 inches of the top in such a manner as to run all surface water away. Ohio is alone in its effort to standardize the amount of accommodations furnished. Where sewerage system and water supply are available, there shall be one sink and one drinking fountain to every 6,000 square feet of floor area or fraction thereof. Similar equipment will be required in the basement for each 350 or fewer pupils of each sex.

V. TOILETS.

Location of outbuildings.—Twelve States have taken some action to regulate the location of outbuildings for toilet purposes. Delaware,[6] Idaho,[7] Indiana,[8] Louisiana,[9] and Montana[10] require that outdoor

[1] 16th Bien. Rep. (1908–1910), p. 72.
[2] 2d Bien. Rep. of State Pub. Health Dept., p. 247.
[3] Reg. of State Bd. of health, issued May 1, 1911.
[4] School Laws, pp. 45–46.
[5] School Law, p. 135.
[6] 16th Bien. Rep., State Bd. of health (1908–1910), p. 72.
[7] Reg. State Bd. of health.
[8] Bull., 1913, No. 52, U. S. Bu. of Ed., p. 15.
[9] Public School Laws (1912), p. 127.
[10] Reg. 26 of State Bd. of health.

toilets shall be situated not less than 100 feet from the well or cistern. Idaho further provides that no surface drainage from a water-closet shall be permitted to reach any well or cistern; Montana holds up the approval of plans in towns of over 1,000 unless the distance limit set above is observed. In the rural districts of Vermont toilets need be only 20 feet from the building.[1] In three States connection with the sewer system is required: In Louisiana, if the closets are within 1,000 feet of the sewer; in Texas, if the schoolhouse is within 500 feet of the sewer;[2] in Virginia, if water and sewerage are available.[3] Mississippi requires that every building used for public school purposes shall be provided with two privies maintained in accordance with the plans and specifications of the State board of health. One of these shall be so located as to be adapted for use of the girls and the other for the boys. Kentucky requires that all schools and other "places of public resort" not already connected with an approved system of sewerage shall construct privies proportioned in size and number to the persons and sex of those likely to use them. These privies are to be located "below the level, or draining away from, or as remote as possible from the well or spring," and are to be modeled after the Kentucky sanitary privy or some other plan approved by the State board of health.[4] All these requirements have been established by State boards of health, but in two States, Nebraska and Ohio, the legislatures have acted. In Nebraska the toilets must be placed on that portion of the site farthest from the main entrance to the building.[5]

Ohio, on this point as on numerous others, has gone into the greatest detail. All vaults existing on premises accessible to a sewer shall be cleaned to the bottom and filled with ashes or earth, and no such vaults shall hereafter be constructed where a sewerage system is available. No vault or septic tank shall be placed within 2 feet of any lot line, or 50 feet of any school building, or source of water supply for drinking or cooking purposes.[6] Cesspools may be constructed only with the approval of the local or State board of health and in case no sewerage system is available. No tight cesspools can be placed within 2 feet of any lot line, 20 feet of any building, or 30 feet of any source of water used for drinking purposes; no leaching cesspool can be placed within 100 feet of any dwelling or tight cistern, or within 300 feet of the source of any water supply.[7]

Standard equipment for outdoor toilets.—Standardization of the equipment of outdoor closets has begun in a number of the States.

[1] Rule of State Bd. of health.
[2] School Laws, p. 93.
[3] Ibid., p. 46.
[4] See bulletin of the State board of health of Kentucky, Vol. III, July, 1914.
[5] Ibid., p. 53.
[6] State building code, part 4, title 18.
[7] Ibid., title 16.

In Ohio no septic tank or filtration bed can be constructed until the site has been inspected, and the plans and specifications have been approved by the State board of health; and no such tank or bed can be used for the designed purpose until its construction and equipment have been approved by the same body.[1] Absolute central control and the ability to follow up plans and specifications into execution makes an admirable arrangement; it disposes of the particular defect that was found to exist in the law creating the schoolhouse commission of Utah.[2]

Waterproof receptacles are contemplated by the requirements in several States. The State boards of health in Idaho, Montana, and Vermont demand that boxes for outdoor closets be water-tight, but Montana waives this regulation if the vault is dug in soil approved by the health officer. Virginia compels dry closets to be maintained in a clean and wholesome condition as standardized by the State board of health. Louisiana requires for closets not connected with a sewer system, a Stiles sanitary closet, cesspool, or septic tank. New Jersey and Ohio, however, are in advance of most of the others in this regard. The State Board of Education of New Jersey requires that the vaults shall not extend beneath the floor of the closet, and that they shall be built of concrete or brick laid in cement mortar.[3] Ohio's State building code contains similar provisions, but goes further in stating that such a part of the vault as extends beyond the walls of the outbuilding shall be tightly covered.[4] Moreover, the vaults shall be given a half-inch coat of Portland-cement mortar inside and outside, and finally a cement wash, similar to the final step in constructing an ordinary water-tight cistern. The bottom of the vault must be from 6 to 8 inches thick. These tight walls shall extend 1 foot above the ground to prevent surface drainage. The material used for urinals is touched upon in four States. The Indiana law stipulates that all conduits to urinals shall be of galvanized iron, vitrified drain pipe, or other impervious material draining into a sewer or other place approved by health authorities;[5] the Ohio law states that all receptacles used for water-closets or urinals, and all troughs or gutters employed for any such purpose, shall be of certain waterproof, noncorrosive materials;[6] while in New York the same end is secured for new buildings through the decision of the commissioner of education to hold up all plans that do not specify nonabsorbent, noncorrosive materials in the construction of urinals.[7] In New Jersey the latrines must be of metal if plans are to be approved by the State board of education.

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[1] Ibid., title 17.
[2] See p. 6, ante.
[3] State Building Code.
[4] Part 4, title 18.
[5] School Law, p. 136.
[6] State Building Code, part 4, title 11.
[7] Circular letter of Aug. 1, 1912.

Miscellaneous provisions.—Several other provisions applying to outdoor toilets are scarcely capable of classification. In Idaho and Montana the contents of the box must be sprinkled daily with dry earth or lime during the school term and the receptacle emptied when two-thirds full. In Vermont earth closets must be provided with a box of road dust, sawdust, or ashes, and be screened against flies. These regulations are by authority of the State boards of health. But in Utah the law itself specifies the dry-earth system in the care of vaults. The vaults are to be cleaned monthly during the school year and oftener if the local health officer thinks necessary.[1] The statutes of Pennsylvania compel vaults to be cleaned or properly disinfected within 30 days after the close of each school year; the outbuilding itself is to be scrubbed, whitewashed on the interior, and the vaults covered with fresh dirt or dry-slacked lime, within 10 days of the opening of each school year.[2] The only other State to mention the scrubbing of the outbuildings is Louisiana, which specifies that this shall be done at intervals of a week. A rule of the Delaware State Board of Health calls for vaults at least 3 feet deep, and will not allow them to be filled nearer than within 1 foot of the surface of the ground. Wisconsin and Minnesota state that the boys' outhouse shall be provided with suitable urinals.[3] Both these States are attempting to improve toilet accommodations in rural schools by making this a point to be considered in the granting of State aid. Indeed, if the electors in a Wisconsin district fail to allow the necessary funds for maintaining a proper condition of the toilets, the town clerk at the request of the school board shall arbitrarily add such amount to the district tax budget.

In Indiana the board of health has brought together several of the more valuable miscellaneous regulations of other States, modifying the form in a few cases. Both the vault receptacle and the floor of the closet must be of cement.[4] Dry loamy earth, wood ashes, sifted coal ashes, or slaked lime must be thrown into the vault daily during the school term, and the contents of the vault removed twice per year. The vault itself must be screened against flies. An alternative to such outdoor sanitary closet is the indoor crematory closet, specifications for which are given in still greater detail.

Indoor closets.—For indoor closets very few regulations exist. Three States only have taken up accessibility of accommodations. The Ohio State building code, the rules of the Indiana State Board of Health, and a circular letter of the commissioner of education of New York, each establishes a standard of one closet for every 15 females

[1] School Law, p. 32.

[2] Purdon's Digest, p. 698.

[3] Laws of Wis. Relating to Com. Schools, pp. 93-94; Bull. No. 40, Minn. dept. pub. inst., "State Aid," p. 5.

[4] Bull., 1913, No. 52, U. S. Bu. of Ed., pp. 16-17.

or every 25 males, and one urinal for every 15 males. The Ohio law also demands that if buildings are over three stories, toilets be placed on each story. In Ohio all forms of fixtures that do not permit the whole surface to be flushed are prohibited. The Minnesota Board of Health insists that water for washing the hands be provided in indoor toilets.[1] The State Board of Education of New Jersey will not approve plans unless, where running water can be secured, porcelain-bowl closets, and slate, corrugated glass, or porcelain urinals, properly ventilated, are furnished. The floors within 3 feet of closets and urinals are to be of nonabsorbent, waterproof material, and suitable wash bowls must be provided in each toilet room. In Texas all urinals and closets must be wiped with an approved disinfectant once a week.[2] Nebraska alone safeguards against disease by special disinfection; after any contagious disease is discovered in a school, disinfection of indoor closets is to be accomplished by the use of a 5 per cent solution of carbolic acid or 3 per cent solution of liquor formaldehyde, while under the same circumstances outdoor vaults are to be treated by throwing into them milk of lime.[3] In Vermont the plumbing regulations of the State board of health must be satisfied.

Light and ventilation of toilets.—Nine of the States have more or less definite rules covering ventilation and light; two of them by statute, two by State education authorities, four by State boards of health, and one by factory inspector. Minnesota and North Dakota demand direct air and light from the outside for all classes of toilets.[4] Idaho, Minnesota, Montana, and New Jersey require that toilets be well lighted and equipped with means of ventilation independent of the system that ventilates the remainder of the building. New York calls for independent ventilation of toilet rooms, and the Vermont Board of Health and the Massachusetts inspector of buildings[5] specify that closets and fixtures must be so located and arranged that no odors can reach any occupied rooms. In Minnesota the vent in the toilet must be placed at or near the ceiling, while in New Jersey a wooden or metal flue 8 inches square must run from the floor through the roof. Massachusetts requires that local vents for each water closet and for each 1′ 4″ in length of slab urinals shall be not less than 11 square inches, and shall be connected with a duct of combined area, having a rise of 1″ to each 1′ 0″ run to a vent duct provided with mechanical or other approved means for maintaining proper circulation. Ohio with characteristic exactness requires that the seats shall be provided with tight-fitting

[1] State Health Laws and Regulations, May 1, 1912, p. 54.
[2] Rule of State board of health, School Laws, p. 92.
[3] Rule of State board of health, School Laws, p. 120.
[4] Minn. State Health Laws and Regs., May 1, 1912, p. 54; N. Dak. Gen. School Laws, p. 104.
[5] See "Regulations relating to the erection, alteration, and inspection of schoolhouses." Form B, 1914.

covers and a vent pipe shall extend 3 feet through the roof, such pipe to be at least 6 inches square for every square yard or part thereof of vault surface.

Indiana's State board of health has recently brought together a number of points connected with indoor closets, and has gone into them in detail. One of them is special ventilation; another is the prevention of the use of corrosive or absorbent materials in connection with fixtures; another is the provision of lids for seats, and individual stalls from 16 to 20 inches wide for urinals; another is a requirement that urinals be flushed as often as every 15 minutes.

The common towel.—Prohibition of the common towel bids fair to spread over the country with a rapidity equal to the prohibition of the common drinking cup. As in the fight against the common cup, Kansas again led the way with a resolution of the board of health, effective September 1, 1911.[1] Seven other States now have regulations abolishing the common towel from schools: Wisconsin, by statute;[2] Indiana, Louisiana, Montana,[3] Ohio,[4] and Pennsylvania,[5] by authority of the State health officers; and Massachusetts by the State health authority exercised under a specific permissive act of the legislature.[6] The usual method is to abolish the towel from "public places," but sometimes "schools" are particularized.

VI. PROTECTION AGAINST FIRE AND PANIC.

The blanket regulation.—Blanket regulations, or the power to make such regulations that may mean little or much, are found in 10 States. The statutes of New Jersey confer upon municipalities the power to make all needful regulations regarding fire; those of Florida put the responsibility for prescribing adequate stairways and fire escapes upon county boards of public instruction. In Minnesota the State Department of Education shares with the local authorities the right to specify means of fire protection. The usual blanket provision runs almost verbatim in four States: "All halls, doors, stairways, seats, passageways, and aisles, and all lighting and heating apparatus and appliances must be arranged to facilitate egress in case of fire or accident;" but this is not retroactive in any case. In New York, Utah, and Virginia it is enforced by the approval of plans at the hands of State education officers; in North Dakota there is no enforcing authority. The Massachusetts and the Maine statutes contain an

[1] Bull. Tex. State Bd. of Health, July, 1911, p. 8.

[2] Common drinking cups and roller towels, Public Health Bulletin, No. 57, issued by the U. S. Pub. Health Service.

[3] Bull. Dept. Pub. Health, Montana, vol. 6, No. 1.

[4] Rule of Jan. 22, 1913.

[5] Rule of Jan. 3, 1913.

[6] Monthly Bull. State Bd. of Health, Aug., 1912, p. 290; acts of 1912, ch. 59.

equivalent clause requiring school buildings to have sufficient means of egress and escape from fire, and the Massachusetts supervisor of plans "may make such further requirements as may be necessary to prevent the spread of fire, or its communication from any steam boiler or heating apparatus therein."

General construction.—New Jersey, Connecticut, Indiana, Pennsylvania, and Ohio have taken up the general construction of buildings with a view to fire prevention. In the first-named State this has been done through the State building code of the State board of education, which has the power to hold up all plans by nonapproval; in Connecticut, Ohio, and Pennsylvania it is covered by the statutes; in Indiana by the State board of health. The rule in New Jersey is that two-story buildings of over four classrooms must have their outer walls of hard-burned brick, stone, or concrete, an incombustible roof, fireproof walls and fireproof floors to corridors; buildings of three or more stories must be of fireproof construction, i. e., wood may be used only for doors, windows, window frames, roof rafters, trusses, trim, and finished floors. No Connecticut schoolhouse for pupils below the high school may contain over two stories above the basement; for high-school pupils it may extend three stories above the basement, if fireproof, but all nonfireproof buildings of over seven classrooms must have their outer walls and walls separating schoolrooms from corridors built of fireproof material. Indiana limits the height of all schools to two stories above the basement. In Pennsylvania districts of over 500,000 inhabitants, all schools of two or more stories must be of fireproof construction; in other districts this requirement applies only to buildings of over two stories.

Ohio, again, is much more detailed and somewhat more strict. Schools of three stories—the maximum permitted—must be fireproof. This allows wood only for floors, doors, windows, and the usual trim of the interior of rooms. The specified height of the stories, 15 feet from floor to ceiling, makes it impossible, even with a basement, for children to be much more than 40 feet above the ground. Frame structures are permitted only for single-story buildings, without basements, with their floors not over 4 feet above the grade line, provided also that they are not within 30 feet of the lot line or any other structure and not within 200 feet of the city fire limits. Thus it happens that many schools of one story and most of those of two stories fall under the third type of construction, which is denominated *composite.* This is the same as the fireproof except for the use of wood as columns, girders, beams, and roof trusses. But if a composite building is erected in connection with one of fireproof construction, the two shall be separated by fireproof walls, and all communicating openings guarded by fireproof doors. Both fireproof walls and fireproof doors are fully standardized by law. No room accommodating over 100

persons shall be located above the second story in a fireproof building, nor above the first story in a composite building.

Special construction.—Furnace room and heating apparatus are most often mentioned under the head of special construction. Furnace, boiler, and fuel rooms in Indiana schools must be of fireproof construction; the furnace, if located in the basement, shall have a fireproof floor above it, but may never be situated immediately beneath any lobby, corridor, stairway, or exit. According to the Kansas law, furnaces are to be covered on top with asbestos or masonry, and ceilings above furnaces are to be covered with asbestos. The furnace itself shall not be within 18 inches of woodwork. Ohio allows the furnace, hot-water heating boiler, low-pressure steam boiler, and fuel supply to be within the school building if they are inclosed in a thoroughly fireproof heater room, but no boiler or furnace may be located under "any lobby, exit, stairway, or corridor." The New Jersey State Board of Education will approve no plans unless they show boiler and furnace rooms inclosed by fireproof walls, floors, and ceiling, and all openings closed by self-closing fire doors. The State schoolhouse commission of Utah goes further still, and withholds approval if the furnace or heating apparatus is placed in the basement or immediately under the building. Connecticut is more liberal, requiring only in schools of over seven rooms, not fireproof, that all wooden construction about heating apparatus shall be well protected by fireproof material.

Approval of plans in New Jersey includes several other precautions in special construction. Ceilings in buildings over one story shall be of sheet metal or plastered on metal lath. All waste paper chutes shall be of fireproof material. Chimneys may not be started upon any floor or wood beams. They shall be lined with cast iron, clay, or terra cotta pipe throughout, or, in the case of large flues, with fire brick 15 feet above the smoke inlet. All timber must be framed 2 inches clear of the brick of chimneys. Ventilating flues or ducts must not touch any wood construction. Steam or hot-water pipes, if protected by a metallic shield, shall be 1 inch from wood construction, otherwise 2 inches away. In Minnesota, whenever furnace heat is in use, the hot-air flue leading from the furnace to the schoolroom is built of brick or of heavy galvanized iron covered with asbestos. In Indiana, chimneys must extend from the ground to a point 4 feet above the highest part of the roof, and the outside walls shall not be less than 8 inches thick. North Dakota and Massachusetts have an identical law to the effect (1) that in new buildings no wooden flues or air ducts may be used for heating or ventilating purposes, and (2) that no pipe for conveying hot air or steam shall come within 1 inch of woodwork unless suitably protected by incombustible material.

Corridors and inner stairways.—The story of abundant facilities for escape from burning buildings, blocked and worthless in the hour of need, has been told so often that five States have definitely tried to forestall disaster from such a cause. The laws are similar: Stairs and other passages leading to exits shall be unobstructed (Colorado); passageways shall be unobstructed (Indiana); aisles and passageways leading to means of egress must be kept open (Massachusetts, Rhode Island); no passageway shall be less in width than the stairway or exit to which it leads (Ohio). Corridors, stairways, and toilets shall be well lighted artifically, and said artificial lights shall be kept burning when the building is occupied after dark (Ohio). Main corridors shall be at least 11 feet wide, and in buildings of more than eight rooms at least 13 feet wide (Indiana). These provisions are statutory except those of Indiana, which are the decree of the State board of health.

TABLE 3.—*Protection against fire and panic.*[1]

States and references.	Blanket regulation.	General or special construction.	Corridors and inner stairways.	Exits.	Exterior escapes.	Alarms and fire-fighting apparatus.	Drills.
California: School Law, sec. 1890.	.....	.....	.....	.....	Lma.....	.....	
Colorado: Rev. Stat., 1908, ch. 18.	.....	.....	Lma....	Lma.....	.....	.....	
Connecticut: Laws of 1909, ch. 81; laws of 1913, ch. 40.	Lma....	Lma....	Lma....	Lma.....	.....	Lma....	
Florida: School Laws, p. 90; Fire Code of Public Schools based on Laws of Florida, ch. 5937, sec. 6.	LBpa...	.....	.....	Lma; LXAma.	.....	LXAma	LXAma.
Idaho: Rev. Codes, secs. 1550–52.	.....	.....	.....	.....	Lma.....	.....	
Illinois: Rev. Stat. (1911), ch. 55a.	.....	.....	.....	.....	Lma.....	.....	
Indiana: Book of instructions by State bd. of health, p. 38; School Law, p. 133; Burns' Annotated Stat., 1908, sec. 3841; Bull., 1913, No. 52, U. S. Bur. of Ed., pp. 10, 13, 18; School Law, pp. 139–141.	XA'ma.	XA'ma.	XA'ma.	Lma; XA'ma.	Lma; LX''C'pa.	.....	
Iowa: Laws of 1909, ch. 220; School Laws, p. 136; Supplement, Code of 1907, sec. 4999.	.....	.....	.....	Lm (cities and incorporated towns); LA''ma; Lma.	LpXC''ma.	.....	LA''ma.
Kansas: Laws relating to common schools, pp. 90–91; Gen. Stat. of 1909, ch. 44.	.....	LBC''ma	.....	LBC''ma..	Lma.....	Lma....	LBC''ma
Kentucky: Stat. of 1909, secs. 1830–32.	.....	.....	.....	.....	LpXC''m (larger cities).	.....	
Louisiana: Public School Laws, p. 108.	.....	.....	.....	.....	Lma.....	.....	

[1] Explanation of symbols:
1. Regulating authority: Statutory (legislative enactments)=L. Judicial (decisions in common or statute law)=J. Administrative (rules of State departments of education, health, etc.)=X.
2. Enforcing authority: Educational: State=A. County=B. Town=C. District=D. Health: State =A'. County=B'. Local=C'. Fire or factory inspectors, etc.: State=A''. Local=C''.
3. Character of regulation: Mandatory=m. Permissive=p. Encouraged by financial aid=e.
4. Extent of application: State wide=a. Outside certain classes of cities=b. Consolidated districts only=c. Rural districts only=d.

TABLE 3.—*Protection against fire and panic*—Continued.

States and references.	Blanket regulation.	General or special construction.	Corridors and inner stairways.	Exits.	Exterior escapes.	Alarms and fire-fighting apparatus.	Drills.
Maine: Laws of 1909, ch. 100.	Lma			Lma	Lma	Lma	
Maryland: Laws of 1906, ch. 709.					LpXA″ma		
Massachusetts: Acts of 1907, ch. 503; Rev. Laws, 1902, ch. 104, secs. 23 and 26; acts of 1913, ch. 655, secs. 11, 15, 40, 41.	Lma	Lma	Lma	Lma	Lma	Lma	
Michigan: Gen. School Laws, pp. 177,74.				Lma	LpXA″ma		LA″ma.
Minnesota: Rev. Laws, 1905, ch. 36; State Health Laws and Regulations, p. 54; Bull. No. 40, Dept. of Pub. Instr.	L (local officials) pa.	XAeb				XA′ma. LC″ma.	
Mississippi: Code of 1906, secs. 2267, 2272.			Lma	Lma			
Missouri: Rev. Stat., 1909, ch. 103, Art. I.					Lma		
Montana: School Laws, pp. 121–22.						Lma	Lma.
Nebraska: Cobbey's Compiled Stat., 1907, secs. 2334–35; Law of Apr. 10, 1911; Regulations of Dept. of Labor.				Lma	LpXA″ma		
New Hampshire: Laws relating to common schools, p. 33.				Lma	LpXC″ma		
New Jersey: Compiled Stat., 1709–1910, p. 2325; State Bldg. Code; School Laws, p. 73.	L (municipalities) p.	XAma	XAma	Lma XAma.	XAma		
New York: Educ. Law, sec. 453.	LAma		Lma	Lma	Lmb		Lma.
North Carolina: Public Laws, 1909, ch. 637, secs. 3, 5.				Lma			
North Dakota: School Laws, pp. 104–5; Laws of 1913, ch. 255.	Lma	Lma	Lma	Lma	Lma		
Ohio: State Bldg. Code, part 2, title 3; ibid., part 3, title 1; ibid., title 7; School Laws, p. 88; acts of 1913.		Lma	Lma	Lma	Lma	Lma	Lma.
Oklahoma: Law of Apr. 28, 1908.				Lma	Lma		
Oregon: School Laws, p. 63; Laws of 1913, ch. 177.				Lma			Lma.
Pennsylvania: School Code, p. 43; Purdon's Digest, pp. 1681–83; ibid., Supplement, p. 5501; School Code, pp. 169–70.		Lma		Lma	LpXC″ma	Lma	Lma.
Rhode Island: Laws relating to education, pp. 80–82.			LA″ma.	LA″ma	Lma		
Texas: Law effective July 1, 1913.	LAm		Lma				
Utah: School Law, p. 30	LAmb	LAmb					
Vermont: Regulations State Bd. of Health issued May 1, 1911; Gen. Laws relating to pub. instr., p. 62.			XA′ma	XA′ma	XA′ma		Lma.
Virginia: School Law, p. 43; ibid., p. 120.	LAma		LAma	LAma	LpX (city council, county supervisors) a.		
Washington: School Laws, p. 115.							Lma.
Wisconsin: Laws of 1911, ch. 441, 378.				Lma	Lma	Lma	

Number and situation of stairways.—So many States have decided upon true fire escapes, i. e., some sort of ladder, stair, or tube outside the building itself, that the number and position of inner stairways have received attention in only a few of the remaining States. The law of Texas and the Vermont State Board of Health agree in requiring that in schools of over one story there shall be two stairways as far apart as practicable. Ohio schools of fireproof construction must have at least two stairways located as far apart as possible and continuous from the grade line to the top story. Likewise the basement must have two stairways as far apart as possible, leading up to the grade line. These stairways shall be equipped with standard self-closing fire doors at each floor and surrounded with fireproof walls. Composite buildings are required to have exterior escapes, while fireproof buildings are not.[1] Connecticut and New Jersey make the number of stairways dependent on the number of classrooms. In the former, schools of over seven classrooms, not fireproof, must have fireproof stairs at opposite sides of the building. In the latter, buildings of over four and less than nine classrooms must have two flights of stairs at opposite ends of the building. If there are over eight classrooms, three or more flights must be provided, subject to the approval of the State board of education as to number and location, though one flight shall always be near each end of the building. In New Jersey all stairs of new buildings must be inclosed by fireproof walls and built of incombustible material.

The winding stair.—One of the most common regulations governing stairways has reference to turns, whereas the breadth and number of stairs, and the dimensions of treads, appear to be fraught with so much greater importance. Circular stairs or winding treads are prohibited in New Jersey, Connecticut, and Vermont. All turns must be made by platforms in Indiana, New York, North Dakota, Texas, and Virginia. North Dakota stipulates that a wider step is not a platform, and Texas fixes 4 feet as the minimum width of the platform.

Other stairway regulations.—Indiana, New York, North Dakota, Ohio, and Virginia forbid any door to open upon a stairway unless a platform or landing, at least as wide as the door, intervenes between such a door and the stairs. Indiana, Minnesota, Mississippi, New Jersey, Ohio, Texas, and Vermont require a hand rail on each side of the stairs. There must be an intermediate landing, i. e., a landing between stories, in New Jersey and Texas, while the length of flights is limited in Vermont to 15 and in Ohio and Minnesota to 16 steps. Ohio, Minnesota, and Indiana have also set a mini-

[1] In composite buildings, however, the basement stairs must be guarded by walls of incombustible material from 6 to 12 inches thick, according to the material used. The basement stairs in all cases are to be of stone, cement, or iron; the areaways around these are to be guarded on both sides by rails.

mum of three risers for a flight, compelling the use of gradients for differences in floor levels that would demand fewer risers. These gradients must not rise over 1 inch in 12. The minimum width of stairs in Indiana is 5 feet; in New Jersey (except cellar stairs) and Vermont, 4 feet; in Ohio, 3 feet 6 inches; in Minnesota 3 feet. Ohio alone has set a maximum width for a single flight, 6 feet. Vermont sets a minimum total width of stairways at 20 inches per 100 pupils. Ohio sets the same figure as for minimum total width of *exits* in fireproof buildings, 3 feet per 100 pupils for the first 500, thereafter a decreasing ratio. While this appears to be much more liberal than Vermont's 20 inches, it must be remembered that one-half of the required width in composite buildings is given to inclosed fireproof stairs or fire escapes, the other half to the main-service stairs. All runs of stairs in New Jersey and Ohio are to be of uniform width, uniform rise and tread throughout. In the former State, risers shall not exceed 7 inches, nor treads 12 inches, including the projecting nosings. In the latter the following limits have been set:

Limitations of stair risers and treads in Ohio.

Classes of schools.	Maximum height of riser.	Minimum width of tread.
	Inches.	*Inches.*
Primary schools	6	11
Grammar schools	6½	11
Other schools	7	10½

Indiana also stands for a uniform rise and tread, viz, that which Ohio has set for grammar schools. All treads are to be covered with rubber or equally nonslipping surface (Ohio). New Jersey seeks to avoid slipping by specifying that corrugated metal safety treads are to be embedded in concrete stairs. No closet for storage can be placed under any stairs (Indiana, Minnesota, New Jersey, Ohio).

Doors to open outward.—About half the States have dealt in some manner with exits from school buildings. The various statutes and rulings touch in different ways the number of exits, their situation, their size, and especially the swinging of doors, together with other important topics. The following States require that all doors open outward:

Without additional qualification—Colorado, Indiana, Michigan, Minnesota, New York, Vermont.

For buildings over one story—Kansas, New Jersey, Pennsylvania, Virginia, Wisconsin (all buildings in cities).

For buildings with more than one room—Florida, Mississippi, North Carolina, North Dakota.

For buildings with more than two rooms—New Hampshire.

Public school buildings only specified—Florida, Louisiana.

Public and private schools both specified—Kansas.

Outer doors only specified—Florida, North Dakota, Ohio, Pennsylvania (in old buildings).
Outer doors and all others leading thereto—Connecticut, Indiana, Iowa, Louisiana, New Jersey, Oregon, Pennsylvania (in new buildings), Wisconsin.
To affect cities and incorporated towns only—Iowa.
Leading from principal room and building—Nebraska (not retroactive with respect to rural schools).[1]

If double or storm doors are used in Indiana, the outer ones shall be without fastenings, but held in place by spring hinges.

Louisiana and New Jersey permit expressly the use of swinging doors, but in the latter State they must be provided with plate-glass windows. In Ohio double-acting, sliding, or revolving doors are forbidden. Even those doors that according to law must swing outward shall be so arranged that they shall not in so swinging obstruct any other passageway.

Doors to be unlocked.—With the exceptions noted in parentheses following, these States demand that all doors be unlocked during school hours: Colorado, Connecticut, Indiana, Iowa, Kansas (public and private, if over one story), Michigan, North Dakota, Oregon (exit doors only mentioned), Wisconsin. New York, North Dakota, and Vermont provide that the standing leaf of double doors shall be fastened with movable bolts operated simultaneously at top and bottom by one handle at a convenient height on the inner face of the door. All exit doors in Indiana must be unlockable from within. In New Jersey all exit doors, and in Ohio all doors leading directly to the outside or simply toward the outside, must be incapable of being locked so as to prevent their being opened by turning a knob or pressing a bar or lever from the inside. Rhode Island, while silent regarding exits in ordinary service, provides that all doors or windows leading to fire escapes shall swing outward and be unlocked during school sessions.

Number of exits.—There is more uniformity as to egress from rooms than as to number of outer exits. In Indiana and North Carolina all rooms above the second story must have more than one means of egress. The Massachusetts acts of 1913 say that all rooms containing 10 persons, whether or not above the second story, shall have more than one means of egress. Ohio makes two exits mandatory for each room in buildings of composite construction, one of these to lead to the exterior fire escape or stairs, the other to the corridor. All basement rooms used by pupils shall have an exit aside from the usual means of entrance and egress. In buildings of frame construction there shall be two exits from each room, one of them leading directly to the open with steps to the grade. Kansas requires that above the first story there shall be two exits separate from those for the lower floor, but suitable iron or steel fire escapes

[1] This affects practically all rural schools, since the law was enacted in 1877.

may be provided in lieu of these exits. Maine requires only that there shall be two means of egress from each story above the first, while in New Jersey there shall be an exit to the ground for every flight of stairs leading to the first story. Connecticut demands at least one exit at opposite ends of nonfireproof buildings containing over seven classrooms, and a fireproof door at the head of the basement stairs.

Width of exits.—The Colorado law reads that doors must have a width of 5 feet for every 250 persons seated within. North Dakota ignores the number of pupils entirely and compels all schools of over one room hereafter erected to have an exit at least 4 feet 6 inches wide. While the laws of all other States except Ohio make no requirements, the latter State has worked the ground over pretty thoroughly. In the first place exit doors in addition to being level with the floor must not be less than 6 feet 4 inches high and 3 feet wide. The maximum width is 6 feet. The total width of means of egress from fireproof buildings is graduated, since this classification includes the largest structures, in the following manner:

To accommodate not over 500, width of 3 feet per 100 persons.
To accommodate 500–1,000, additional width of 2 feet per 100 additional persons.
To accommodate over 1,000, additional width of 1 foot per 100 additional persons.

The buildings of composite construction must have exits 3 feet in width per 100 persons accommodated. Frame buildings, being limited to one story, are cared for by two 3-foot exits.

Fire escapes.—The decision as to number, location, and character of fire escapes is left more to the discretion of officials than anything connected with fire protection. Thus far in the discussion it has been mainly a question of the *law* on stairways, exits, etc. Now it becomes largely a question of *technical judgment* exercised under law. The local fire officials in Iowa are allowed to determine the number of fire escapes, if more than one is to be erected. In Indiana the local or the State fire officials may determine both the number and the type of escapes, though the more vital questions go to the chief inspector of the State. In Virginia, by State law, the city council in municipalities, elsewhere the county supervisors, decide upon character and design of escapes. The Kentucky law gives full control of fire escapes in cities of over 10,000 to the local fire chief. The Michigan law permits factory inspectors, whenever they see fit, to require schools of over one story to be provided with fire escapes, and to make out specifications for the same. The State fire marshal of Maryland may compel the erection of such means of exit as he judges proper, and the commissioner of labor in Nebraska also has very large powers. The regulation of fire escapes in New Jersey and Vermont is left to central administrative authorities—to the State board of education in the former, and to the State board of health in the latter. Eleven

States rely in part or wholly upon administrative regulations, 13 upon statutory requirements.

Relation to height of building.—The height of the buildings affected is of great consequence. The Maine, Massachusetts, and Maryland laws do not state what height of building is within the statute, and the same is true of the administrative rules of New Jersey and Vermont. The Ohio law requires exterior escapes even from one-story buildings, unless of fireproof construction. One or more escapes for all buildings over one story is the standard in California, Michigan, and North Dakota. Only those over two stories are covered in Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Missouri, Nebraska, New Hampshire, New York (except New York City), Oklahoma, Pennsylvania, Rhode Island, and Wisconsin. The Virginia law applies only to buildings over three stories.

Number of escapes.—In the majority of cases the legal number of fire escapes is indefinite. The Indiana, Iowa, Kansas, Kentucky, and Wisconsin statutes speak of "one or more," and many other States leave the inquirer in doubt. Scarcely a half dozen have standardized their regulations on this point. Illinois and Missouri schools must have one escape for every 50 persons above the second story. Pennsylvania schools must have two escapes if there are over 100 people above the second story. Oklahoma is more strict, with an escape for every 30 above the second story; Nebraska cuts the number to 25. New Hampshire adopts a different basis, viz, one escape for every 150 feet or fraction thereof that the building measures in length. Rhode Island's law directs that the escape or incombustible stairs be at each end of the building.

Accessibility.—The accessibility of fire escapes was to some slight extent discussed under "Exits."[1] This was unavoidable, since some of the laws make no distinction between those exits leading to fire escapes and those used for ordinary purposes. Escapes are usually reached through windows, but in Massachusetts, New Jersey, and New York doors must be used. In New Jersey it is provided that the doors for this purpose must be cut to floor level. The means of access shall be one or more windows at each story in Illinois, Indiana, Iowa, New Hampshire, Oklahoma, and Pennsylvania; two windows at each story in Nebraska; and "at least two" at each story in Wisconsin. North Dakota demands that the escape be accessible from each schoolroom. Idaho, Maine, and Missouri stipulate only that the escape shall be accessible from each story. In the following States the means of access just mentioned apply only above the first story: Indiana, New Hampshire, New York, North Dakota, and Wisconsin. The Michigan law speaks of "landing and balconies at each story above the first," but does not mention their accessibility.

[1] See pp. 40 and 41.

From the standpoint of the interior of the building, a few miscellaneous provisions relate to exits to escapes.[1] In Florida the State superintendent has decided that all doors and windows leading to fire escapes shall be labeled accordingly; and Vermont and Pennsylvania have a similar regulation. According to the Iowa and Oklahoma statutes, signs at all landings and in all rooms shall signify the location of escapes. Massachusetts fixes 5 inches as the minimum height of the letters that shall be used to mark each exit; Ohio compels the use of letters 6 inches high. In Indiana the lower sash of windows must open outward or upward. Window exits in Ohio are indirectly prohibited. They may lead only to a type of fire escape that is not to be used on schools.

Landings for escapes.—Another point closely connected with accessibility of escapes is the custom of placing landings or balconies opposite exits. Platforms of some sort must connect with exits in Indiana, Iowa, Maine, Massachusetts, Michigan, Missouri, Nebraska, New Hampshire, North Dakota, Ohio, Oklahoma, Pennsylvania, Vermont, and Wisconsin. In Ohio there must even be landings between stories if necessary to keep flights from exceeding 18 risers. Massachusetts regulations say not exceeding 15 nor less than 3 risers in stairs. No winders are permitted. Balconies must be provided with railings in Indiana, Maine, Massachusetts, Missouri, Nebraska, Ohio, Pennsylvania, Vermont, and Wisconsin. The railing is to be 3 feet high in Indiana, Missouri, and Pennsylvania. Vermont demands 2 feet 10 inches; Wisconsin 2 feet 9 inches. Ohio varies the standard from 2 feet 6 inches to 4 feet, according to circumstances. In Vermont and Nebraska the space below the railing must be filled in with some sort of netting. Commonly the rail is specified to be of the same incombustible material as the fire escape itself. The floor of the landings has not been overlooked. In Nebraska it must be on a level with the story, and in Vermont not more than 9 inches below the sills of communicating windows. In Ohio this is reduced to 7 inches. The size of platforms is mentioned in the statutes of at least four States; in Vermont they must be 4 feet wide; in Wisconsin, 3 feet 4 inches; in Nebraska, as wide as the windows and 2 feet deep; in Ohio, not less than $3\frac{1}{2}$ feet square in any case, and under some circumstances larger still. The load capable of being borne per square foot of landings brings out some difference of opinion. The Nebraska law calls for strength sufficient to bear a load of 300 pounds per square foot, but 75 and 80 pounds is the average regulation as shown by the laws of Ohio, Pennsylvania, Vermont, and Wisconsin.

The materials of escapes.—It seems scarcely necessary to enter into a review of the material to be used in the construction of escapes,

[1] References bearing on this paragraph are given under "Exits" in Table 3.

since the very term "fire escape" implies incombustible material. Most of the laws are carefully framed; such expressions are found as "fireproof," "incombustible," "iron," "wrought iron," "steel," etc. The type of the escapes is very important and does not show so great uniformity. Aside from the discretion vested in certain executive authorities, the statutes and published regulations of administrative bodies make possible the following summary of permissible structures for fire escapes:

Ladders—Idaho, Iowa.
Ladders or stairs—Illinois, New Hampshire, Oklahoma.
Stairs—Massachusetts, Missouri, New Jersey, New York, North Dakota, Ohio, Pennsylvania, Vermont, Wisconsin (not retroactive).
Stairs, chutes, or toboggans—Nebraska.

How made secure.—Safety of escapes is contemplated by several provisions that have to do with the method of fastening to the building. Indiana requires that the fastenings extend clear through the wall. Wisconsin calls for the support of the stairs by the balcony, and of the balcony by brackets. Ohio provides for three different forms or types of escape. One is supported by brackets from the wall of the building. Another may run parallel with or at right angles to the wall of the building, and is independently supported by columns at a distance of at least 2½ feet from the building. The third is a tower 8 feet from the building, with the stairs between any two adjacent stories broken into two flights running in opposite directions. Bridges connect this type of escape to the building at each story.

Extent of escapes.—When the extent of escapes is mentioned, aside from accessibility at different stories, it is principally to insure that the inmates shall be able to reach the ground without delay or danger. Missouri, for instance, provides that the escapes shall extend to the ground. Indiana requires a drop ladder 16 inches wide from the lower platform to the ground. Wisconsin substitutes for the drop ladder a permanent balance stairway. Ohio interdicts the use of any outside stairway or fire escape unless it comes within 8 feet of the grade line.

Slant.—Slant is regulated in two ways. The maximum degree of slant is set down as 45° in Indiana, Pennsylvania, and Wisconsin, and as 55° in Missouri. The matter is settled in other States by the regulation of treads. The maximum height and width of tread in New Jersey are 7 and 10½ inches, respectively. This tends toward a slant of less than 45°. Vermont fixes the angle satisfactorily with a minimum tread of 9 inches and a maximum rise of 8½ inches. Ohio does likewise with a fixed tread of 10 inches and a riser of 7 inches.

Railings.—Handrails on escapes, apart from platforms, are required on both sides in some States even when the escape does not diverge from the building. Vermont fixes a minimum of 2 feet 10

inches, North Dakota one of 2 feet 6 inches, Wisconsin one of 3 feet. New Jersey leads all with a screen 5 feet high on the outside. Ohio has a varying requirement of from 2 feet 7 inches to 3 feet 7 inches, the distance to be measured perpendicularly from the nosing of the step.

Miscellaneous.—The width of escapes varies widely, as can be seen from the following:

Inches.
20.—Nebraska.
22.—Wisconsin.
24.—Pennsylvania.
36.—New Jersey, North Dakota.
40–44.—Ohio.

So also is there variation in standards for strength of escapes. Pennsylvania places 400 pounds as the load per tread; Vermont places only 200. Vermont figures throughout on a safety factor of 4. Vermont, too, requires a strength of 100 pounds per step for the flight as a whole; Wisconsin insists on 150 pounds; Ohio has several provisions of a like character. Escapes are not to pass a window unless unavoidably (Missouri); if they pass a window, the window is to be glazed with wire glass (New Jersey). All surfaces of platforms and stairs shall be of "rough diamond" to prevent slipping (Nebraska). Besides the stair escapes there shall be in each room above the second story a rope 1 inch in diameter securely attached to a chain over a window. This rope shall be long enough to reach the ground (Pennsylvania). Maine, Massachusetts, New York, Ohio, Vermont, and Wisconsin, especially warn that all escapes shall be kept free from various obstructions, such as snow, ice, etc. The doors to escapes must not be bolted or locked during school hours (New York).

Penalties.—Penalties are more consistently announced by the various States for violation of the laws on fire protection than for the violation of any other provision in the whole code of school hygiene. Not all of these have been noted in the examination of statutes, but some samples have been collected. Michigan is one of the most severe, with a fine of from $100 to $1,000 and imprisonment of from three months to a year. Imprisonment is not a rare penalty, however.

Alarms and fire-fighting apparatus.—In five States schools of certain sizes must have a fire-alarm system. Schools of over three rooms come under the law in Minnesota. In Connecticut and Ohio (except one-story buildings without a basement) there must be gongs located in the halls and operated from each story; but in Connecticut a bell in each room, similarly operated, may replace the gong. In Montana there must in all schools of over 30 pupils be a fire gong operated from each room and from the basement. In Florida special gongs to be

used for fire signals only must be capable of operation from both the basement and the office floor, and a fire-alarm box must be located in the principal's office.

One chemical fire extinguisher on each floor is required in Florida, Kansas, and Minnesota; one for each 2,000 square feet of floor area or less on each story above the basement in Ohio; one on each story above the first in Minnesota (if there be over two stories). Massachusetts requires that there be in readiness on each story above the second pails of water or other portable apparatus, or a hose attached to suitable water supply and capable of reaching any part of the story. Maine demands that each story above the first shall be equipped with some portable fire apparatus or a hose attached to a suitable water supply. In Ohio a standpipe and a hose in the basement are sufficient, unless a 75-foot hose will not reach all parts of the building, in which event other standpipes must be constructed. In Minnesota, buildings over two stories used for educational purposes shall, "when practicable," be provided with a $1\frac{3}{4}$-inch inside standpipe with sufficient $1\frac{1}{4}$-inch hose connected therewith on each floor and sufficient pressure either constantly maintained or available through pumps at a moment's notice, or a $2\frac{1}{2}$-inch metallic standpipe on the outside with accessible connections at each story. In cities and villages where there is a water supply, Wisconsin requires that there shall be attached to fire escapes a 3-inch standpipe, but no connection must be maintained except on the roof.

Drills.—The importance of fire drills has appealed to several States. Florida specifies drills for public schools only; Michigan and Iowa, for public and private schools. It is probable that most of the other States contemplate only the public schools in prescribing drills. The drills must occur as often as once a month in 9 of the 11 States maintaining them; in Washington, semimonthly; in Montana, weekly. The size of schools that must practice the drills varies in the following manner for the different States:

Schools subject to law on escapes, exits, and fire-fighting appliances—Pennsylvania.
Schools of over—
- 30 pupils—Montana.
- 50 pupils—Vermont, Washington.
- 50 pupils in average daily attendance—Ohio, Oregon.
- 100 pupils—Kansas.
- 100 pupils and over 1 story high—New York.

Schoolhouses over 1 story high—Iowa.

Florida and Michigan do not state any exceptions to the liability to keep up the drills. Very little other direction is given for this exercise. The drills in Florida are to include movement with unobstructed exits and the diversion of the lines to exits not regularly used, as well as the use of fire escapes. In Pennsylvania the drill is to include the use of the escapes and other appliances.

VII. LIGHTING.

Though the lighting of schools has not received the stress in regulations and statutes that hygienists claim it deserves, the aspects of the matter regarded in different States have been to a considerable extent the same, thus making a tabular presentation of some value.

TABLE 4.—*Lighting.* [1]

States.	References.	Light ratio.	Direction.	Height of windows.	Color of walls, ceiling, shades.	Miscellaneous.
Delaware	Sixteenth Bien. Rep. of State Bd. of Health, p. 72.		XA'ma			
Indiana	School Law, p. 134; Bull. 1913, No. 52, U. S. Bu. of Ed., p. 11.	L m a; XA'ma.	Lma	Lma	Lma	XA'ma.
Louisiana	Pub. School Laws, p. 125	XA'ma				
Minnesota	Rules, Dept. of Ed., Bull. 56	XAma	XAma	XAma	XAma	
Montana	Regulation 26, State Bd. of Health; Laws of 1913.	X A 'm (towns over 1,000); Lma	X A 'm (towns over 1,000); Lma	X A 'm (towns over 1,000).		
New Jersey	State Building Code	XAma	XAma			XAma.
North Dakota	Gen. School Laws, p. 103	Lma	Lma			
Ohio	State Building Code, part 2, title 3.	Lma	Lma	Lma		Lma.
Pennsylvania	School Code, p. 42	Lma	Lma			
South Dakota	Bien. Rep. of Supt. of Pub. Instr. (1910–1912), p. 155.		XAma	XAma		XAma.
Texas	Law effective July 1, 1913; acts of 1913, ch. 126.	Lma	Lma	Lma		
Vermont	Regulations State Bd. of Health issued May 1, 1911.	XA'ma	XA'ma	XA'ma	XA'ma	
Virginia	School Laws, pp. 43–44	LXBma	LXBma			

[1] For explanation of symbols, see p. 7.

Light ratio.—Students of school hygiene have, as a rule, decided on 1 to 5 as the proper ratio of window area to floor area, and legislative enactments and administrative rules have usually followed this minimum. The standards in different States, so far as established, are exhibited below:

1 to 4—Virginia.
1 to 5—Indiana (if light is from the north), Minnesota, New Jersey, North Dakota, Ohio (study, class, and recitation rooms, and laboratories), Pennsylvania, Vermont (1 to 4 recommended).
1 to 6—Indiana, Texas.
1 to 7—Louisiana, Montana (all schools).
1 to 10—Ohio (play, toilet, and recreation rooms).

It is not infrequent to find "actual glass area" mentioned instead of "window area." North Dakota permits the use of reflecting lenses to offset a deficiency in actual lighting area; New Jersey will allow a 10 per cent deficiency to be corrected by the use of prism glass in the upper sash.

Direction of light.—Under the head of "Direction of light" a number of possible rules may be taken up. Children must not sit facing a

window (Delaware, Pennsylvania, South Dakota, Texas). A stronger provision is for light from the left, or left and rear only (New Jersey, North Dakota, Ohio, South Dakota, Vermont, Virginia). Montana's law for light is from left and rear. Indiana is the only State which has gone to the logical limit in protecting the eyes of both pupils and teachers by permitting light only from the left, except for left-handed students. This exception is without force obviously, since nowhere have left-handers been segregated. Minnesota and Texas have also gone some distance toward unilateral lighting, but in Minnesota exception is made of those unusual classrooms over 24 feet wide. Texas demands that the main light come from the left in all 1-room schools, and in larger schools as nearly as architectural demands and the systems of ventilation will permit.

The Minnesota Department of Education is the only body that has referred in regulations to the points of the compass from which light should come. This solitary instance in itself is evidence of the disagreement that still obtains among those who have thought and written so much on this particular subject. The Minnesota regulation is:

> Buildings shall be so placed that each room, except such as may be herein specified, shall receive sunlight during some part of the day. Laboratories, manual training rooms, rooms for mechanical and freehand drawing, and other rooms not continuously used for recitation and study, may be lighted from the north. Light from the east is most desirable. Light from the west holds second place. Light from the north as well as from the south should be avoided in school rooms and study rooms.

Height of windows.—Closely allied to direction of light and light ratio is the height of the windows. Hygienic considerations apply especially to the height of their tops. Minnesota, South Dakota, and Vermont require that the windows shall approach as near the ceiling as possible under the usual architectural limitations. Indiana and Montana make the permissible difference in height of ceiling and of windows not over 1 foot. Ohio makes it 8 inches, Texas reduces it to 6. It is apparent, nevertheless, that however close windows may come to the ceiling, a low ceiling in a broad room will prevent proper lighting. Hence we find in Ohio that the height of the window head above the floor must always be 40 per cent of the width of the room, if lighting is unilateral. And in Texas no part of a study hall or classroom is to be further from the window than twice the height of the window from the floor, except where adequate skylights are provided. The height of the window sill from the floor may also be of hygienic significance if the room is ventilated by windows. No maximum distance from the floor is given in any State, but the minimum is 4 feet in Indiana and Vermont, 3½ in Texas.

Interior color scheme.—The color of walls, ceilings, and window shades is deserving of far more attention than it has so far received.

Indiana directs that the shades shall be of some neutral color, "as blue, gray, slate, buff, or green." In Vermont they are to be gray or buff, two for each window, hung in the center, so that either the lower or the upper half may be shaded. Minnesota has nothing on color, but has declared that translucent rather than opaque shades shall be used. Indiana takes ground for a neutral color for walls and ceilings also, such as "gray, slate, buff, or green." Vermont requires light gray, buff, or greenish walls.

Miscellaneous.—Among the miscellaneous provisions there are some interesting clauses from the Ohio statutes on exposure and artificial lighting. No room containing windows for lighting any schoolroom shall be nearer than 30 feet to any opposite building, structure, or property line, nor may windows used for lighting schoolrooms open on courts, unless the wall of the court opposite such windows is at a distance equal to the height from the lowest window sill to the top of the wall of the building. This insures that direct light may come from an angle not over 45° from the horizontal. A similar condition is secured as to areaways for lighting basement windows, by requiring that the width of the area shall be equal to the height from the lowest window sill to the adjoining grade line. In Indiana, whenever any external object interferes with the proper lighting of a schoolroom, prism glass is to be used for the proper projection and diffusion of the light.

New Jersey and South Dakota have tried to guard against cross shadows by directing that windows be as close together as possible. Indiana confines ceilings within the limits of 12 to 14 feet, and does not permit rooms over 25 feet wide. The window sash shall not have over four lights, and the tops of all windows shall be square.

If gas is used in Ohio schools there shall be a minimum of one 3-foot burner—

Per 15 square feet floor area in auditoriums and gymnasiums.
Per 24 square feet floor area in halls and stairways.
Per 12 square feet floor area in class and recitation rooms.

Burners shall be placed 7 feet above the floor line and on fixtures that do not move or swing. If electricity is used there shall be a minimum of 1 candlepower—

Per 2½ square feet floor area in auditoriums and gymnasiums.
Per 4 square feet floor area in halls and stairways.
Per 3 square feet floor area in class and recitation rooms.

Indiana is less precise, but calls for fixtures for artificial lighting to be placed near the ceiling and the rays to be deflected upward by proper shades.

VIII. HEATING.

In this section the apparatus employed for heating will be ignored as far as possible, that the subject of ventilation may be left for consideration at its proper place. The consequence is that provisions affecting heating will be found unusually homogeneous. The primary concern is the temperature of the various rooms. This is to be kept at 70° F. in all sorts of weather in Delaware,[1] Idaho,[2] Indiana,[3] Massachusetts,[4] Montana,[5] New Jersey,[6] New York,[7] Pennsylvania,[8] South Dakota,[9] and Vermont.[10] The statutes of two of these States speak of the "average" temperature as 70°, but the meaning of "average" is doubtful. Possibly it means at some reasonable height above the floor. The required temperature in Montana applies only to schools in towns with over 1,000 population. In Massachusetts it applies to corridors as well as rooms. Ohio makes a differentiation between rooms.[11] The heating system there must be able to maintain in all corridors, hallways, playrooms, toilet rooms, recreation rooms, assembly rooms, gymnasiums, and manual training rooms a uniform temperature of 65° in zero weather; but all other parts of the building must be kept up to 70°. An exception is made, however, in favor of rooms with one or more open sides, used for open-air schools. Indiana covers emergencies for which no one may be responsible by providing that if the temperature falls to 60° or below without immediate prospect of 70° F. being attained, the school shall be dismissed.[12] The North Dakota law merely reads that the fresh air shall be warmed to 70° F.[13]

The jacketed stove.—The abuses that arose a generation ago from seating pupils adjacent to a direct source of heat have largely been abolished; they went with the unjacketed stove. This insanitary contrivance has been disposed of in many States by modern requirements regarding ventilation which the unjacketed stove can not meet. But in a few cases actual prohibitory legislation or ruling has been judged necessary. Indiana demands a jacket of two sheets not less than three-fourths of 1 inch apart.[14] The outer sheet is to

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[1] Rule State Bd. of Health, Sixteenth Bien. Rep. State Bd. of Health, p. 72.
[2] Rule XXXIX of State Bd. of Health.
[3] School Law, p. 135.
[4] Rules of inspector of factories and public buildings.
[5] Regulation 26, State Bd. of Health.
[6] State Building Code.
[7] Ruling of Commis. of Ed., Circ. Letter of Aug. 1, 1912.
[8] School Code, p. 43.
[9] School Laws, p. 74.
[10] Regulations of State Bd. of Health, issued May 1, 1911.
[11] State Building Code, Part 2, title 3, sec. 21.
[12] School Law, p. 136.
[13] General School Laws, p. 103.
[14] Bull., 1913, No. 52, U. S. Bu. of Ed., p. 12.

consist of heavy galvanized iron, or other equally durable material, and to be lined with sheet asbestos; the inner jacket shall be of tin or some "equally efficient" metal. The jacket is to extend to the floor and be not less than 3 inches from the stove.

Pennsylvania demands merely some sort of a jacket.[1] Delaware permits the alternative of jacketing the stove or seating pupils at least 6 feet away from it. In South Dakota no plans will be approved by the State superintendent unless stoves have a metal jacket extending 1 foot or 2 feet above the stove, with arches around the bottom extending 8 or 10 inches from the floor.[2] All ventilating stoves in Ohio schools (and ventilation is required in every school) must have a jacket of galvanized or black iron, extending from a point 4 inches above the stove to the cast-iron tray on which the stove stands. This tray must be 3 inches high and of the same size as the inclosing jacket.[3] North Dakota tries to abolish the unjacketed stove by State aid.[4] Minnesota uses the same force to secure a shield of Russia iron or copper-plated steel, with a lining of asbestos and an inside lining of tin, with an ample air space between. Such a shield must stand 6 inches away from the stove and the lower edge must be not less than 12 inches above the floor.[5]

Miscellaneous.—Pupils are to be protected from drafts, too, according to a few provisions. Vermont and Massachusetts forbid drafts which result in differences of over 3° in temperature between any points on the breathing zone of the room. All sources of heat must be so jacketed in buildings hereafter constructed in Texas that desks near the source of heat shall not be more than 5° hotter than those on the distant side of the room, and systems of heating either classrooms or study halls shall be equipped with a regulator which will automatically control the temperature of the room to within 2° of any set standard.[6] If windows are relied upon for ventilation in Pennsylvania, they must be equipped with some device to protect pupils from currents of cold air. The Indiana law prohibits direct radiation in study rooms, but it may be used in halls, offices, laboratories, and manual training rooms. The Vermont Board of Health has advised that if the building is of wood, it can be made warm by using heavy building paper or filling in between the sheathing and lath with clean, dry sawdust. Pennsylvania requires a thermometer in every schoolroom or recitation room.

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[1] School Code, p. 42.
[2] Bien. Rep. Supt. Pub. Instr., 1910–12, p. 159.
[3] State Building Code, Part 3, title 10, sec. 1, 3.
[4] State Aid to Consolidated, Graded, and Rural Schools.
[5] Bull. No. 40, Dept. of Pub. Instr.
[6] Law effective July 1, 1913.

IX. VENTILATION.

With less than half the States saying a word on ventilation, and about half of these using their power only through approval of plans for new buildings, conditions are far from what they should be. Table 5 shows the general status of the subject of ventilation to date.

TABLE 5.—*Ventilation.*[1]

States.	References.	Floor space.	Air space.	Rate of air change.	Location of inlets and outlets.	Size of inlets and outlets.	Windows or doors in ventilation.	Miscellaneous.
California	Rules and Regulations State Bd. of Ed., sec. 9.	.....	.....	.....	.....	.....	XAma..	
Delaware	Sixteenth Bien. Rep. State Bd. of Health. p. 72.	.....	.....	.....	.....	.....	XA'ma..	
Indiana..	School Law, pp. 134, 135; Bull., 1913, No. 52, U. S. Bu. of Ed., pp. 11, 14, 15.	.....	Lma....	Lma; XA'ma.	Lma; XA'ma.	Lma; XA'ma.	.....	
Louisiana	Public School Laws, p. 125.	.....	XA'ma.	XA'ma.	.....	.....	XA'ma.	
Massachusetts.	Regulations of inspector of factories and public bldgs.	.....	.....	XA''ma.	.....	XA''ma.	.....	
Minnesota.	Rules, Dept. of Ed., Bull. 56.	XAma..	XAma..	XAma..	XAma..	XAma..	.....	XAma.
Montana.	Laws of 1913; Regulation 26, State Bd. of Health.	Lma....	Lma; XA'm (towns over 1,000).	.....	.....	.....	.....	XA'm (towns over 1,000).
New Jersey.	State Bldg. Code....	XAma..	XAma..	XAma..	.....	XAma..	.....	XAma.
New York.	Education Law, sec. 451; Circ. letter of Aug. 1, 1912.	XAmb..	XAmb..	XAmb..	.....	.....	.....	XAmb.
North Dakota.	Gen. School Laws, p. 103; State Aid to Consolidated, Graded, and Rural Schools.	LXAma	LXAma	LXAma	XAeb...	XAeb...	.....	XAeb.
Ohio.....	State Bldg. Code, part 2, title 3; Ibid., part 3, title 10; School Laws, 1914, S. B. 9.	Lma....	Lma....	Lma....	Lma....	Lm	.....	Lma.
Oklahoma.	Second Bien. Rep. State Pub. Health Dept., pp. 246, 247.	.....	XA'ma.	.....	.....	.....	XA'ma.	
Oregon...	School Laws, p. 43...	.....	.....	.....	.....	.....	Lma....	
Pennsylvania.	School Code, pp. 42–43.	Lma....	Lma....	Lma....	.....	.....	Lma....	
South Dakota.	School Laws, sec. 237; Bien. Rep. of Supt. of Pub. Instr., 1910–1912, p. 159.	Lma....	Lma....	Lma....	XAma..	XAma..	.....	XAma.
Texas....	School Laws, p. 92; law effective July 1, 1913; acts of 1913, ch. 120.	.....	.....	Lma; XA'ma	Lma....	.....	.....	Lma.
Utah.....	School Law, p. 30....	Lmb....	Lmb....	Lmb....	.....	.....	.....	Lmb.
Vermont.	Regulations of State Bd. of Health.	XA'ma.	XA'ma.	XA'ma.	XA'ma.	XA'ma.	.....	XA'ma.
Virginia..	Laws of 1908, ch. 187; School Laws, pp. 43, 45.	LXBmb	LXBmb	LXBmb	.....	.....	.....	LXBmb.
Washington.	School Laws, p. 124..	.....	.....	.....	.....	.....	XAma..	
West Virginia.	Code, Annotated, 1906, sec. 4382; acts of 1915.	.....	.....	.....	.....	.....	.....	LXA'pa.
Wisconsin.	Laws of 1907, ch. 600.	.....	.....	.....	.....	.....	.....	LXApe.

[1] For explanation of symbols, see p. 7.

Floor space.—The figures given are probably not supposed to apply to assembly rooms, but to study and recitation rooms. This is stated plainly in some of the laws. Ohio is the only State which has varied the amount according to the age of the students. The minima in square feet per pupil are as follows:

Sq. ft.
12—North Dakota.
15—Montana, New York, Pennsylvania, Utah, Virginia.
16—Ohio (primary grades).
18—Minnesota, New Jersey, Ohio (grammar grades), South Dakota[1], Vermont.
20—Ohio (high schools).
35—Minnesota (rooms for manual training or domestic science).

Air space.—Minima in air space per pupil may be fixed either in gross or by specifying the floor space per pupil and also the height of ceiling. Where the two methods have been combined, it sometimes happens that the air space required is greater than the product of minimal floor space and height of ceiling; hence at least one of the minima must be exceeded. Where this is the case the figures in parentheses are given to indicate the legal minima in floor space and ceiling height. The numerals at the beginning of each line below is the minimum cubic feet of air space per pupil.

Cu. ft.
200—Louisiana, Montana, New York, North Dakota (12 by 12) Ohio (primary grades), Pennsylvania, Utah, Vermont, Virginia (12 by 15).
216—Minnesota, New Jersey, South Dakota.
225—Indiana, Ohio (grammar grades), Oklahoma.
250—Montana (towns over 1,000), Ohio (high schools).

Ohio has also a varying arrangement for ceilings, significant for lighting as well as for ventilation. The minimum height for toilet, play, and recreation rooms is 8 feet; for all other rooms not less than half the average width of the room, and in no case less than 10 feet.

Rate of air change.—Nothing in school hygiene is more conventionalized than the amount of fresh air per pupil per minute. Thirty cubic feet is the standard in all the States listed in this column of Table 5, with the exception of Ohio. The requirement is not unconditional, however, in each case. In Pennsylvania it does not affect even the new buildings which are only one story high and cost less than $4,000. The possibility of the use of windows is suggested by three States that say nothing on windows in their legislative or administrative requirements; Massachusetts holds for 30 cubic feet of fresh air if the outside air is below 30° F.; Minnesota maintains the 30 cubic feet only when outside and inside temperatures differ by over 30° F.; Texas waives the minimum except in cold weather. There is also a rule of the Texas State Board of Health that 50 cubic

[1] State Bd. of Health, Bull., July, 1913, p. 37, par. 103.

feet per minute shall be furnished, but the legislative enactment calling for 30 cubic feet is so much younger as to suggest that the rule of the board of health had fallen into abeyance, if it were ever effective. The Ohio law states that the air in all parts of the building, except corridors, halls, and storage closets, shall be changed at least six times per hour. In view of the minimum air space per pupil this would mean from 20 to 25 cubic feet per pupil per minute.

Rate of air change is measured in various ways, some of which are very misleading. Indiana alone has described how the calculation is to be made. The rules of procedure of the State board of health are as follows: The anemometer test shall be made over the foul-air vents in the classrooms, if jacketed heaters or gravity systems are used; over the fresh-air inlet of the fresh-air room and the fresh-air inlet in classrooms, if a plenum system is in use; at the fresh-air intake and at the foul-air vents in classrooms, if a double system of mechanical ventilation is in use. In every test five readings shall be taken, one near each corner and one at the center of the air opening to be tested. A deduction of 5 per cent shall be made for a grill in the air opening. The inlets in buildings of over one room are to be screened with 8-inch gauge wire of 1¼-inch mesh. This accounts for the small deduction made for grill work.

Location of inlets and outlets.—On the position of inlets and outlets, either in relation to each other or to the room, seven States have had something to say. They must be on the same side of the room in Indiana (in buildings of over one room), Minnesota, North Dakota, and Vermont (usually). For the larger schools it is common to find the inlets placed well up on the walls. In Indiana the height is not less than 5 feet above the floor. Minnesota and Ohio place inlets 8 feet or more above the floor, but Ohio permits foot warmers in the floor. Vermont says merely that they must be near the ceiling, while North Dakota goes no further than to forbid their being in the floor. Vents are to be placed at floor level in Indiana, Minnesota, and Texas; at or near the floor level in North Dakota and Vermont; not over 2 inches above the floor line in Ohio; at the base of the chimney in South Dakota. If the wardrobe is not separated from the classroom, the vent shall be placed in the former (Indiana, Ohio). "Foot warmers" in the floor are forbidden in Indiana.

Size of inlets and outlets.—The size of flues may be governed by their relationship (1) to the size of room, (2) to the size of other flues, (3) to the size of registers. Very different bases have been adopted for the determination of size of flues in relation to size of room. Indiana requires only that ventilating ducts shall be ample to withdraw the air four times per hour, but the State board of health has standardized with commendable accuracy and has made somewhat different requirements when the foul-air and smoke vents are

separate than when they are the same or when a different system of ventilation is employed. The cubic feet of air space in the room is the guide; but if ceiling height is figured at 12 feet, the minimum permitted, we can approximate the minimum ratio of cross section of inlet to floor area. For one-room buildings it will vary according to conditions from about 1 to 350 to 1 to 650, which is considerably less than in the other States compared in the next paragraph. For the larger buildings with plenum systems of ventilation inlets may have a minimum cross-sectional area of 9 square inches for each occupant, while for gravity systems the minimum is 16 square inches per occupant. Supposing the room once again to have the minimum ceiling of 12 feet and to be filled to its capacity of one person per 225 cubic feet of air space, the ratio of cross section of inlets to floor area would be about 1 to 300 for a plenum system and 1 to 170 for a gravity system.

For an ordinary one-room school with a jacketed stove and 30 pupils in the room Vermont demands an inlet 24 inches by 30 inches; New Jersey fixes 1 square foot per 10 pupils as the cross section of intakes. South Dakota and Minnesota make the size of intakes dependent upon floor area. By utilizing the minimum requirements of floor area per pupil, we can secure a ratio between the cross section of inlets and the floor area for comparison of the four States as follows:

1 to 108—Vermont.
1 to 144—South Dakota.
1 to 160—Minnesota (gravity system, connected with furnace or steam plant).
1 to 180—New Jersey.
1 to 270—Minnesota (plenum system).
1 to 400—Minnesota (buildings of less than four rooms with furnaces or jacketed stoves).

The results for Minnesota, at least, are quite closely comparable with those for Indiana (see preceding paragraph).

Absolute minima.—Minnesota has also set absolute minima, regardless of the size of the room. The State superintendent, in passing upon applications for State aid, will hold for inlets and vents 15 inches in diameter for one and two-room schools. These minima will maintain the ratio 1 to 400 for rooms 18 feet by 24 feet to 18 feet by 27 feet. For furnace heat and homemade systems of ventilation the State superintendent in granting State aid stands for inlets and outlets 20 inches by 20 inches, the latter perhaps containing a smokestack of 8 inches diameter. The fixed minima for inlets and outlets in Indiana is 12 inches by 12 inches.

Relative size of inlets and outlets.—Consideration of the size of flues in relation to size of other flues means a comparison of inlets and outlets. Usually the requirement is that the outlets shall be at least

as large as the inlets (Massachusetts, New Jersey, Ohio, South Dakota). The State superintendent of North Dakota takes the opposite view. In Indiana, however, the policy is reversed according to the method of ventilation employed. If it is the plenum, the inlets may be 10 per cent smaller than the outlets; if it is by gravity, the outlet may be one-eighth smaller than the inlet.

Relative size of registers and flues.—Registers of the same size as the horizontal area or cross section of warm-air ducts are branded as inefficient in Minnesota. The State superintendent asks for an excess of 25 per cent in register area over flue area, to compensate for grill work, whereas in Indiana an allowance of but 5 per cent is made for this factor. Registers for vents are declared unnecessary in Minnesota, and forbidden in Indiana except with stoves and heaters. The latter State permits an approved damper to close the vent when not in use. The Ohio law calls for vent registers 50 per cent larger than vent flues, if a register is used.

Windows or doors in ventilation.—A half dozen States frankly admit their reliance upon doors or windows for ventilation. This is seen in the requirement that all windows must lower from the top and raise from the bottom (Delaware); that windows must be capable of being lowered from the top and the transoms opened (Louisiana); that if windows alone must be relied upon they must be readily adjustable at top and bottom (Pennsylvania). More direct is the rule that doors and windows shall be opened at each intermission to flood the room with fresh air (California, Indiana, Oklahoma, Oregon, Washington).

Miscellaneous.—Miscellaneous regulations on ventilation can not be conveniently summarized because of their diversity. A few general provisions may be placed first: There must be a satisfactory means of exhaust and "some form of forced ventilation in buildings of more than four rooms" (Montana). There shall be facilities for exhausting the foul air "independently of atmospheric changes" (New York, Utah, Virginia). Rural schools which, among other things, install "an adequate system of ventilation" are entitled to special State aid of $50 per year for three years (Wisconsin). The State superintendent is empowered to fix the standards, and the county and district superintendents are empowered to rule whether the standards are met.[1] The State board of health "shall also examine into and devise as to * * * the ventilation and warming of public halls, churches, schoolhouses," etc. (West Virginia). The velocity of the air introduced shall not be over 300 feet per minute (New Jersey), or it shall be between 300 and 400 feet per minute (New York). In a steam gravity system for each square foot

[1] These standards were briefly referred to on p. 55, ante.

of horizontal area of fresh-air flues there must be 50 square feet of indirect radiation, and an accelerating coil equivalent to not less than 20 square feet shall be provided for each vent flue (Minnesota). The object of the first part of this provision is the heating of the fresh air, a point that is not overlooked by the State superintendent in examining petitions for State aid. Fresh air must be heated before it is discharged into the schoolroom (North Dakota). The introduction of fresh air at the base of a direct radiator is prohibited (Minnesota). Each classroom must have separate inlet and outlet flues (New Jersey). The smoke pipe from a jacketed stove shall enter the vent flue not over 6 feet from the floor (Vermont). An approved ventilating stove is allowed in one and two room buildings (New Jersey). The State superintendent in approving plans will expect the cold-air duct to be lined with metal, with the outer end so sloping as to keep it dry and all openings screened against entrance by animals (South Dakota). In a plenum system of ventilation the air pressure inside the room shall be in excess of that outside (Minnesota). By a separate system of ventilation through vertical flues, hoods shall be provided in all domestic-science rooms and chemical laboratories sufficient to conduct away offensive odors. This system shall be operated by electric fans if an electric current is available or by accelerating coils if steam or hot water is used for heating (Ohio). Gas plates or gas stoves used in connection with either cooking or laboratory work shall be connected by hoods with a separate vertical vent flue, in which an upward draft shall be constant (Indiana).

Humidification.—One item certainly merits the distinction of a separate paragraph. In Minnesota the State superintendent, before he allows State aid to any school, requires that furnace heaters be supplied with a reservoir to humidify the air on its way to the schoolroom. If other simpler forms of heating are in use, an evaporating dish or vessel must be properly placed near the source of heat. An exception is made in favor of steam heat.

X. CLEANING AND DISINFECTING.

Ordinary and extraordinary cleaning and disinfecting.—Provisions for cleaning and disinfecting in relation to the school plant in general are considered here, since discussion of the special care of toilets and outbuildings has been shifted to the section which treats of those accommodations. In over one-fourth of the States only has this important subject been controlled in any degree outside the districts themselves. Some of the laws or regulations are almost model; others are wholly inadequate. State boards of health are to be thanked for nearly all that has been accomplished. Aside from

Connecticut,[1] Massachusetts,[2] Pennsylvania, and Wisconsin,[3] which prohibit by law spitting on the floor of any public building, and Louisiana [4] and Vermont, where the boards of health forbid spitting in any schoolroom, 12 States have entered this field; 9 of these provide for regular or ordinary cleaning or disinfecting; 7 States discuss special cases. Minnesota is disposed of by citing the unique requirement that "each entrance must be provided with foot scrapers and cocoa or steel mats," [5] while the State superintendent of North Dakota has a similar condition when granting State aid.[6]

Treatment of floors.—Ordinary cleaning and disinfecting is covered by all sorts of provisions, such as special treatment of the floors, proper time for the work, prohibitions and prescriptions of methods, materials, etc. All floors except hardwood or tile must be oiled twice a year, and three times if school holds nine months. Oiling shall always be preceded by a scrubbing (Indiana).[7] All floors must be treated with some antiseptic dressing approved by the State analyst. They are to be scrubbed before each treatment, and treated often enough to keep down the dust (Louisiana).

Frequency of cleaning.—As to frequency of cleaning, etc., there are the following standards: All schoolhouses shall be cleaned and disinfected before the opening of each school year;[8] the janitor shall remove chalk dust daily and clean erasers outside (Indiana); floors shall be swept daily; desks, wainscoting, window sills, and blackboards must be wiped daily with a 1–2,000 solution of bichloride of mercury or a 3 per cent solution of carbolic acid; all schools shall be disinfected "before the beginning of each school session" (Louisiana).[9] In rural schools floors, interior woodwork, and windows shall be thoroughly scrubbed and cleaned every three months (Montana).[10] Balustrades of stairways and door knobs are to be wiped daily with a cloth moistened in a solution of formaldehyde or carbolic acid (Nebraska).[11] Every local board of health shall cause each schoolhouse in its jurisdiction to be disinfected every 30 days, except in vacation time (North Dakota).[12] In all cities a method of disinfection shall be adopted for the fumigation of schools at regular intervals of not more than two weeks (Pennsylvania).[13] Pennsylvania further requires that

[1] Acts of 1909, ch. 166.
[2] Act approved Mar. 2, 1908.
[3] Laws of 1911, ch. 407.
[4] School Laws, p. 125.
[5] Bull. No. 40, Dept. Pub. Instr.
[6] State aid to consolidated, graded, and rural schools.
[7] Book of Instructions to Health Authorities, issued by State Bd. of Health, p. 37.
[8] School Laws, p. 137.
[9] Ibid, p. 126.
[10] Laws of 1913.
[11] School Law, p. 121.
[12] Laws of 1911, ch. 63.
[13] Purdon's Digest of Statute Law of State of Pennsylvania, pp. 698–699.

"all school directors, trustees, principals, and presidents of schools and colleges outside of cities * * * pay prompt and regular attention to the disinfection of buildings used for educational purposes immediately after the discovery of any communicable disease within said building."[1] Floors shall be swept daily except on holidays; all wainscoting, window ledges, and furniture shall be wiped daily with a cloth dampened by an approved disinfectant; all removable rugs, cushions, and other upholstery are to be thoroughly aired and sunned by removal from the building weekly (Texas).[2] All sweepings must be removed daily; furniture and woodwork are to be wiped with a disinfectant solution once a month and with a damp cloth once a week (Virginia).[3] All schoolhouses, before school opens at the beginning of each school term, shall be thoroughly cleaned (Wisconsin).[4] The new Wisconsin law of 1913 requires the use of vacuum sweepers.

Methods prescribed.—Prescriptions of method are as follows: "Cleaning shall consist in first sweeping, then scrubbing the floors, washing the windows and all woodwork, including the wooden parts of seats and desks, and the disinfecting shall be done in accordance with the rules of the State board of health," dusting shall be done with an oiled cloth (Indiana); windows shall be thrown open after sweeping and the rooms thoroughly aired, disinfection follows the rules of the State board of health (Louisiana); the local or State board of health must approve all methods of disinfection (Pennsylvania); before sweeping, the floor shall be sprinkled with an approved disinfectant solution, saturated sawdust preferred (Texas); no disinfectant solution is necessary, but the floor must first be dampened with water, damp sawdust, or damp paper (Virginia).

Practices forbidden.—Several very common practices are forbidden in some States. Dry sweeping is tabooed in Indiana. No sweeping can be done until after dismissal for the day in Indiana, Louisiana, Texas, and Virginia. The Indiana State board of health orders that blackboards and erasers shall not be cleaned by pupils, nor until the session is over. With a single exception every rule is of State-wide application.

Extraordinary cleaning.—Extraordinary cleaning or disinfecting follows in seven States immediately upon the discovery in any school of any of a certain class of diseases. These are variously described as "communicable," "dangerous communicable," "contagious," "infectious," and "quarantinable." But three of the States have a special list of specific diseases that call at once for action.[5] This list includes

[1] Rules and Regulations, Aug. 15, 1911.
[2] School Laws, pp. 92–93.
[3] School Laws, p. 45.
[4] Laws of 1911, ch. 44; acts of 1913, ch. 274.
[5] See published rules of boards of health of various States.

scarlet fever, smallpox, and diphtheria in all three States, measles in two, and infantile paralysis, epidemic spinal-meningitis, and bubonic plague in one each. In Indiana and Michigan it is only the rooms attended by the stricken child that must be disinfected, but in the other States the entire building must be closed and treated. The method of disinfection is in the hands of the State board of health with one possible exception, and this body has been very careful in some States to explain everything to the minutest detail. Drawers, closets, and desks are opened. Books are stood on end, wide open. The rooms are made air-tight, kept sealed for six hours, then flooded with fresh air for another six. Corrosive sublimate solution may be afterwards used to wipe all clothes closets and desks; for metal fixtures a solution of carbolic acid in hot water is commonly employed. Formaldehyde is favored by most as the disinfecting gas.

XI. FURNITURE AND EQUIPMENT.

Two items of furniture and equipment at once occur to the mind as media with which the child is almost continually in contact during the school day. These are the books on the one hand, the desk and seat on the other. It is with these in some form that most of the rules under this section deal.

Books.—Two general classes of provisions affect books, (1) those which concern disinfection, (2) those that relate primarily to the hygiene of the eye. Rule XXI of the Idaho State Board of Health states that school or library books taken to a house where Asiatic cholera, smallpox, yellow fever, infantile paralysis, typhus fever, diphtheria (membranous croup), cerebro-spinal meningitis, or scarlet fever exists, must be destroyed. The State law also says that books belonging to any district which happen to be in the house of a pupil when he is confined with a quarantinable disease, must be disinfected by the attending physician before being returned to the school.[1] Rules of the Wisconsin [2] and Nebraska [3] State boards of health are equivalent to that of the Idaho board. The Oregon board requires that under similar conditions books shall be destroyed or properly disinfected before being placed again in circulation.[4] Since Dr. L. B. Nice reported in 1911 that nine States disinfect by steam or burn badly soiled books,[5] it may well be that the above data do not represent fully the present status. The statutes of Maine contain a useful provision that no second-hand books shall be purchased by any district.[6]

[1] School Laws, p. 60.
[2] Rule 11.
[3] School Law, p. 121.
[4] Statutes relating to public health, etc., p. 48.
[5] Monthly Bull., Ohio State Bd. of Health, Aug., 1912, p. 272.
[6] Laws of 1909, ch. 131.

Alabama,[1] Florida,[2] Georgia,[3] Kentucky,[4] Louisiana,[5] Mississippi,[6] Missouri,[7] North Carolina,[8] Oklahoma,[9] and South Dakota,[10] legally authorize textbook commissions, usually of the State, sometimes of the county, to consider in the selection of texts such qualities as printing, type, paper, binding, etc. Oddly enough, these commissions appear not to have adopted definite standards.

Seats and desks.—On general furniture Delaware is at least explicit. The furniture must be modern according to the standards of the State board of education,[11] but what these standards are is a matter of doubt. Apparently they have not been published. Minnesota is the only State that has legally adopted single desks;[12] 20 per cent of all desks and seats in each room shall be adjustable in Indiana.[13] Adjustable furniture is not spoken of in either the Vermont statutes or in the rules of the State board of health, but the correspondence of the latter body shows that the schools at Newbury, Groton, and Royalton have been compelled to put in adjustable seats.[14] The Indiana health authorities in each locality are charged to see that the adjustable furniture is changed once or twice each year to allow for the growth of the pupils;[15] and the State health officers make some special requirements for crippled children. Desks shall be "of suitable size" (Minnesota). The State superintendent in South Dakota before approving plans will look carefully to the spacing of seats.[16] He will expect an interval of 9 inches from the back of the seat to the edge of the desk in primary rooms, 10 inches in intermediate grades, 11 or 12 inches in grammar grades, and 1 foot in the high school. He advises against the policy of placing different sizes of seats in the same row. The Vermont Board of Health describes the seat and desk in some detail.[17] The height of seat shall correspond to the length of the leg below the knee; the seat must be horizontal or slightly curved, the lower back convex, the upper back concave; the desk and seat are to overlap slightly, and the desk for writing to slant about 15°. The New Jersey State Board of Educa-

[1] Gen. Pub. School Laws.
[2] Digest of School Laws, p. 100.
[3] School Laws and Decisions, p. 50.
[4] School Laws, p. 338.
[5] Ses. Laws of 1910, Act No. 39.
[6] School Laws, p. 42.
[7] Revised School Laws, p. 108.
[8] Public School Law, p. 86.
[9] Laws and Opinions for the Regulation and Support of the Common Schools, p. 16.
[10] School Laws, sec. 225–235.
[11] Personal Letter of State Supt., dated May 7, 1913.
[12] State Health Laws and Reg., p. 54.
[13] School Law, p. 135.
[14] Sixteenth Rept. of State Bd. of Health, pp. 26, 25, 44.
[15] Book of Instruction to Health Authorities, issued by State Bd. of Health.
[16] Bien. Rept. State Supt. Pub. Instr. (1910–12), p. 154.
[17] Regulations issued May 1, 1911.

tion includes the location of each pupil's desk and the teacher's desk in the blue prints of the plans on which it passes, and no seating arrangements may be changed without the board's approval.[1] Aisles at the side and rear of the room in South Dakota must be at least 30 inches, all others about 20 inches. According to the Ohio law all classrooms must have aisles on all wall sides. The minima for wall and center aisles are as follows:[2]

Minimum width of aisles in Ohio.

Grades.	Center.	Wall.
	Inches.	*Inches.*
Primary grades	17	28
Grammar grades	18	30
High-school rooms	20	36

For auditoriums additional detailed provision is made. All seats, chairs, and desks for pupils in classrooms or auditoriums shall be fastened to the floor, unless less than 16 pupils are seated in the room. Not a word more about classroom seating, but in assembly rooms (those accommodating over 100 persons) benches or chairs shall not be less than 2½ feet from back to back, measuring horizontally, and the width of the seats shall average 20 inches per person, measuring from center to center of seat arms. No such seat shall be less than 19 inches wide, and if benches are used, 15 inches of bench length shall be allotted each person. In assembly halls no seat shall have more than six seats between it and the aisle. Thus it impresses one that, while Ohio has more legislation on seating than any other State, the entire effort has been directed toward the prevention of injury or death in an emergency, rather than toward conserving the health of the child day by day.

Blackboards.—The Montana Board of Health forbids blackboards between windows.[3] The Indiana law requires that they be a dead black.[4] The Vermont Board of Health combines the two requirements. There appears to be an utter absence of rules regarding the height of blackboards, though several State departments of education make suggestions. Those of South Dakota may be quoted as typical. "The following are the best heights adapted to the various grades: 26 inches for primary grades, 30 inches for the intermediate grades, and 36 inches for grammar and high-school grades."[5]

[1] State Building Code,

[2] State Building Code, Part 2, title 3, sec. 10. The same figures exactly have been adopted by the Ind. State Bd. of Health. See Bull., 1913, No. 52, U. S. Bu. of Ed., pp. 17–18.

[3] Regulation 26.

[4] School Law, p. 135.

[5] Bien. Rep. of State Supt. (1910–1912), p. 152.

XII. MISCELLANEOUS.

Basements.—The basement has often been regarded as a legitimate place to dispose of the overflow in rapidly growing school systems. The possible dangers of basement schoolrooms are receiving recognition at present, and there seems a well-defined drift toward doing away with such quarters altogether except for temporary uses. Minnesota was the first State to take drastic action. A law of 1909 directs that in any city of 20,000 or more no basement room shall be employed for "grade school purposes," unless it is used exclusively for domestic science, manual training, or physical culture.[1] This statute was not made fully operative till the opening of the school year 1912–13, thus permitting towns to adjust themselves to the new conditions. It is now made applicable to a school in any locality, regardless of population. A basement room was defined as one "the floor of which is below the surface of the surrounding ground on all sides of said room." The Ohio State building code declares that all rooms used for school purposes, except those devoted to domestic science, manual training, and recreation, must be wholly above grade line. The exceptions noted may be placed partly below grade if properly lighted, heated, and ventilated,[2] but all basement rooms used by pupils or public must have a waterproof floor.

All two-story school buildings shall have a dry, well-lighted basement under the entire building, the floor of the basement to be cement or concrete, and the ceiling 10 feet high (Indiana).[3] In the smaller buildings, where the basements are not finished or not properly heated and ventilated, a swinging door with spring hinges shall be used to prevent basement air from entering rooms or corridors above (Indiana).[4]

Foundations.—All school buildings shall have a solid foundation of brick, tile, stone, or concrete, and thorough ventilation between ground and floor, the latter to be not less than 3 feet above the earth; and all brick school buildings shall have a foundation of vitrified brick, or of stone, or have above the ground line a layer of slate, vitrified brick, stone, or other impervious material (Indiana). Moreover, no foundation shall be laid on filled ground or soil containing a mixture of organic matter. A rule of the Vermont State Board of Health denies approval of plans unless floors of buildings without cellars are 2 feet above ground and free circulation of air allowed beneath.[5] South Dakota is satisfied with 18 inches.[6]

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[1] Laws of 1909, ch. 52.
[2] Part 2, title 3.
[3] School Law, p. 134.
[4] Bull., 1913, No. 52, U. S. Bu. of Ed., p. 15.
[5] Regulations issued May 1, 1911.
[6] Bien. Rep. of State Supt. Pub. Instr. (1910–1912), p. 151.

Floors.—Provisions affecting floors look mostly toward one end, viz, tightness. All toilet rooms, lavatories, and other rooms where plumbing fixtures are used, shall have a waterproof floor and base of nonabsorbent, indestructible material, such as asphalt, glass, marble, vitrified or glazed tile or terrazzo, or monolithic composition (Ohio).[1] All floors of toilet rooms and others in which plumbing is found shall be of nonabsorbent, waterproof material, with nonabsorbent, waterproof base not less than 6 inches high and nonabsorbent, waterproof sanitary cove; wherever possible the floors of laboratories, domestic-science rooms, and corridors shall be subject to a similar rule; floor coverings are prohibited except in the superintendent's or principal's office, rest rooms, or teachers' rooms (Indiana).[2] The new law in Texas reads that "all floors shall have their surfaces made impervious to water and germs by a coat of boiling paraffin oil or other floor dressing having similar effect, applied immediately after the floor is laid."[3] Floors should be of hard, well-seasoned wood, closely laid, so as to leave no cracks (South Dakota).

Interior finish.—Recent years have witnessed the introduction of much greater simplicity into the architecture of the interior of all classes of buildings, to the end that the collection of dust may be decreased. This is just beginning to influence schoolhouse construction. Ohio has done most in this direction, requiring (1) that all base shall be 6 inches high and have a sanitary cove at floor level, (2) that all interior wood finish shall be small as possible and free from unnecessary dust catchers, (3) that door and window jambs be rounded and plastered, except in museums, libraries, and art galleries. Indiana has practically an identical regulation. The Texas law referred to in the preceding paragraph also provides that all interior woodwork shall be without "such unnecessary fluting, turning, or carving as catch dust and microbes." "Wainscoting should never be used in a school building, as it is insanitary" (South Dakota).[4]

Wardrobes and vestibules.—The Indiana law reads that separate and well-lighted, warmed, and ventilated cloakrooms, or sanitary lockers, shall be provided for each study schoolroom.[5] If separated from classrooms, the wardrobes shall be separately heated and ventilated the same as the former (Ohio, Indiana).[6] A cloakroom shall be at least 6 feet wide and have an outside window (Minnesota).[7] New schools of one and two rooms must have a vestibule of reason-

[1] State Building Code, part 2, title 3.
[2] Bull., 1913, No. 52, U. S. Bu. of Ed., p. 11.
[3] Law effective July 1, 1913.
[4] Bien. Rep. State Supt. Pub. Instr. (1910–12), p. 154.
[5] School Law, p. 135.
[6] Bull., 1913, No. 52, U. S. Bu. of Ed., p. 15.
[7] State Health Laws and Reg., p. 54.

able size (Montana).[1] Corridors when used as coatrooms shall be well lighted and ventilated (Vermont).

Protection from boiler explosion.—Insurance against the horrors attendant upon a boiler explosion have been in the minds of legislators of several States when passing school laws. They have gone about the business in as many different ways. Maine looks to the engineer. It has enacted that a school, church, or other public building heated by a steam plant under or near such building, must employ to care for the same a person whose capacity shall be tested by the local municipal authorities.[2] Massachusetts tests the boiler instead of the engineer. Steam boilers in public buildings are to be inspected as often as once a year, both externally and internally, as to general condition, safety valve, appliances for indicating pressure, etc.; and all boilers shall have a fusible safety plug of lead or something equally fusible.[3] Ohio has decided to change the location of the boiler if necessary. "No cast-iron boiler carrying more than 10 pounds pressure or steel boiler carrying more than 35 pounds pressure shall be located within the main walls of any school building." These three laws regarding steam boilers are no doubt only representatives of their classes, since similar enactments are to be found in a large number of the States.

Rest rooms.—Ohio has spoken on one very interesting feature. In all schools of four to eight class rooms there must be one rest room; in all schools of over eight classrooms, two rest rooms. The equipment of such a room shall consist of a couch, supplies for first aid to the injured, water supply, and toilet accommodations.

The school hack.—Since Indiana has led the country in the movement for consolidation and transportation, it is not surprising that it has regulated somewhat the hygiene of the school hack. This vehicle must be well lighted, heated, and ventilated. Twice a year, once at the opening of school and again at Christmas, it shall be thoroughly cleaned and disinfected according to the rules of the State board of health. There is to be no overcrowding, but each child shall have a comfortable seat. Foot rests shall be provided for smaller pupils if their feet do not rest comfortably on the floor.

Ohio has yet another provision that must be classed as miscellaneous, because it may have a variety of bearings. No school building shall occupy over 75 per cent of a corner lot, or 70 per cent of any other site.

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[1] Laws of 1913.

[2] Laws relating to public schools, p. 49.

[3] Acts of 1907, ch. 465.

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